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Monograph

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Dynamic and static balancing of gyroscopic devices (Dinamicheskoye i staticheskoye uravnoveshivaniye giroskopicheskikh ustroystv) 2d ed., rev. and enl. Moscow, Izd-vo "Mashinostroyeniye", 65. 0303 p. illus., biblio. Errata slip inserted. 4,200 copies printed.

TOPIC TAGS: aircraft flight instrument, gyroscope, gyroscope component, structure vibration, vibration measurement

PURPOSE AND COVERAGE: This book presents the theory of balancing rotating parts of machines and instruments demonstrating the dependence of precision of dynamic balancing upon the quality of the support. Also it analyses basic causes of vibrations and methods of their elimination. Explanations are given of the principles of action of balancing machines and their elements, and practical recommendations on the technique of constructing and balancing them are given. This edition of the book gives additional detailed diagrams and constructions of present balancing machines in the Soviet Union and abroad. This book is recommended for technical engineers working in machinery and mechanical engineering industries and construction departments. It is also useful for teachers and students of higher technical schools.

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Card 2/2

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(RESPIRATION, eff. of radiation

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(ROENTGEN RAYS, eff.

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Derivatives of C_6H_5 . XXXIV. Interaction of Grignard reagents with 2-methoxyethyl 2,3-dimethylvinyl ketone. I. N. Nazarov and L. N. Krivoburna, *Bull. acad. sc. U. R. S. S. C. Acad. Sci. Chem.* 1943, 295-305 (English summary); *Cl. C. A. 38*, 1739¹. $MeMgI$ (from 23 g. $MeMgI$, 140 g. MeI) was treated with 120 g. $MeOCH_2CH_2COCH_3$ (MeI) in 100 cc. Et_2O with cooling and stirring; after refluxing for 4 hrs. and the usual working up there was obtained 30 g. of mixed $MeOCH_2CH_2C(CH_3)_2CH_2CH_2COCH_3$ and $MeOCH_2CH_2CMeCH_2COCH_3$, b_p 60-72°, n_D^{20} 1.4050, d_4^{20} 0.8437. Hydrogenation yields b_p 100-8°, n_D^{20} 1.4540, d_4^{20} 0.8437. $2,3$ -dimethyl-6-methoxyhexane, b_p 165-6°, n_D^{20} 1.4139, d_4^{20} 0.7990. $EtMgI$ (from 18.3 g. Mg and 117 g. EtI) was treated with 104 g. MeI with stirring, let stand overnight, refluxed for 8 hrs. and hydrolyzed by 10% HCl , to yield 40 g. 2-methyl-4-(3-methoxyethyl)-3,6-dimethyl-2,3-dimethyl-2-butene, b_p 122-4°, n_D^{20} 1.4582, d_4^{20} 0.8007. Attempts to isolate the intermediate carbinols in these reactions were unsuccessful. $MeMgI$ (from 4.8 g. Mg and 32 g. MeI) was treated with 20 g. $iso-BuCOCH_2CH_2COCH_3$ to yield 17 g. $MeOCH_2CH_2C(OH)(Me)CH_2CH_2COCH_3$, b_p 83-4°, n_D^{20} 1.4310, d_4^{20} 0.8601. (I. M. Kuznetsov)

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USSR/Chemistry - Acetylene

May/June 49

"Acetylene Derivatives: No 89, Transformations of 2-Butyne-1, 4-Diol,"
I. N. Nazarov, L. N. Terekhova, I. V. Torgov, Inst of Org Chem, Acad
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"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 3

Describes transformation of 2-butyne-1, 4-diol in a solution of methanol
by mercury into 1-methoxy-butane-4-ol-3-on, and latter's behavior in the
splitting off of methanol, and in hydrolysis. Isolates 1-butene-4-ol-3-on
and studies its properties. Submitted 20 Mar 48.

PA 56/49T9

TEREKHOVA, L. N.

Jul/Aug 49

USSR/Chemistry - Acetylene
Chemistry - Androstane

"Acetylene Derivatives, No 94, Synthesis of Polycyclic Compounds Related to Steroids: III, Complete Synthesis of Compounds With Androstane Skeletons and Their Structural Isomers With Methylcyclopentane Rings B," I. N. Nazarov, L. D. Bergel'son, L. I. Shmonina, L. N. Terekhova, Inst of Org Chem, Acad Sci USSR, 4pp

"Is Ak Nauk SSSR, Otdel Khim Nauk" No 4

Reviews results of 5 years of experiments in subject field in tabular and formulary detail. Submitted 20 Mar 48.

PA 63/49T4

Acetylene derivatives XCVII. Mechanism of the polymerization of dimethyl(vinylethynyl)carbozol. I. N. Nazarov and L. N. Terekhova (Acad. Sci. U.S.S.R., Moscow). *Izvest. Akad. Nauk S.S.S.R., Otdel Khim. Nauk* 1950, 66-70; cf. C.A. 44, 3461d.— $\text{Me}_2\text{C}(\text{OH})\text{—C}\equiv\text{C}(\text{CH}_3)\text{CH}_2$ polymerizes like $\text{CH}_3\text{—CH}\equiv\text{CCH}_2$ itself with formation of cyclobutene ring, with 1 vinyl group reacting with the ethynyl group of another mole. The rings thus formed give rise to the primary polymer chains. The intermediate polymers have moderate mol. wts. The intermediates polymers are insol. and have the structure (1000), as shown by chem. study, and have the structure I. The final polymer is insol. and is a complex tri-di-

also gave 2 g. of the other tetrahydroketone (VI or V), b. 170-81°, n_D²⁰ 1.5120, which, hydrogenated over Pt, at first in EtOH, then in AcOH, gave the *acid* analog, b. 160-74°, n_D²⁰ 1.5200, no satisfactory crystalline derivatives of these ketones could be obtained. Heating 5 g. 1-vinyl-1-cyclohexene with 2.5 g. H₂ 20 hrs. at 130° gave 4 g. keto end (VII), m. 111-12° (from MeOH), which yellows on standing and cannot be hydrogenated over Pt, while over Pt only 2 H can be added, yielding a compd. (VIII), m. 113-18° (crude), m. 120-4° (from MeOH). Condensation of 2 g. II with 3 g. 1-vinyl-3'- α -hydroxynaphthalene in 20 ml. dioxane gave in 5 hrs. at 120-30° 4.7 g. resinous products, which gave 1 g. of a compd. (IX), m. 180-201° (from EtOH), hydrogenated to the monobelin (X), m. 140-2° (from EtOH). CVIII. Synthesis of polycyclic compounds related to sterols. 5. Total synthesis of a stereoisomer of 15 methylandrostenedione. I. N. Nazarov and L. D. Bergman. *Ibid* 618-60. 2-Methoxy-1,3-butadiene (I), b. 74-85.5°, n_D²⁰ 1.4408, was prepd. by addn. of MeOH to CH₂=CH-CH=CH₂, followed by cleavage of MeOH by KHSO₄ from the tri-MeO deriv. 1-Methyl-1-cyclohexen-6-one (II), b. 65-7°, n_D²⁰ 1.4612, was obtained from 2-methylcyclohexanone by a method to be later described. Heating I with a large excess of II (the use of lower ratios gives much dimerization and polymerization of I) in CO₂ with 0.5% pyrogallol to 190-210° for 3-40 hrs. yields up to 25% of 1-(6-methoxy- α -methyl-3'- α -hydro-1-naphthalenone (III) (C.I. numbering), b. 95-7°, n_D²⁰ 1.5103 (other values: b. 115-17°, b. 98-102°, n_D²⁰ 1.5078-1.5116); on repeated distn. the product b. 102°, n_D²⁰ 1.5092; semicarbazone, m. 204° (from EtOH). Hydrogenation over Pd gave the decalhydro analog, b. 125-8°, n_D²⁰ 1.5060; semicarbazone, m. 200.5° (from EtOH).

Shaking III with 3% HCl gave the hydrolysis product, α -methyl-1,6-dihydrodecalin-1-naphthalene, m. 57° (from C₆H₆), whose semicarbazone m. 221-2° (decomp.). III (10 g.) in Et₂O treated with C₆H₆ at -70° for 0.5 hr., then in a continued C₆H₆ stream with 20 g. K in 100 ml. *tert*-AmOH and 50 ml. Et₂O, with stirring and C₆H₆ passage continued for 6 hrs. at -70°, and the mixt. allowed to stand overnight and stirred 2 hrs. at room temp., gave, after the usual treatment with H₂O and neutralization of the org. layer with CO₂, 17 g. 1-ethynyl-6-methoxy- α -methyldecylhydro-1-naphthol, b. 114-16° (in a N atm.), n_D²⁰ 1.5208, hydrogenated over Pt to the 1-ethyl analog, b. 104-8°, n_D²⁰ 1.5110, which, shaken 1 hr. with 3% HCl, gave 1-ethyl-6-keto- α -methyldecylhydro-1-naphthol, m. 102-4° (from petr. ether); semicarbazone, m. 220-8° (decomp.; from EtOH). The ethynyl compd. shaken 1 hr. with 5% HCl gave 1-ethynyl-6-keto- α -methyldecylhydro-1-naphthol, m. 158° (from petr. ether-EtOH); semicarbazone, decomp. 232° (from EtOH). The mother liquor, after removal of the above keto compd., yielded an impure isomer of the same, b. 134-7°. Exhaustive hydrogenation of the isomer m. 158° gave 1-ethyl-6-keto- α -methyldecylhydro-1-naphthol, m. 101-2°, identical with that made by hydrolysis of the methoxy analog deriv. Partial hydrogenation of the 1-ethynyl analog gave 1-ethyl-6-methoxy- α -methyldecylhydro-1-naphthol, b. 113-15°, n_D²⁰ 1.5109. (IV). Shaking IV with 3% HCl gave 1-ethyl-6-keto- α -methyldecylhydro-1-naphthol, b. 131-5°, n_D²⁰ 1.5141, whose 2,4-dinitrophenylhydrazones m. 141° (from EtOH-EtOH). Partial hydrogenation of 1-ethynyl-6-keto- α -methyldecylhydro-1-naphthol over Pd in EtOH gave the 1-vinyl analog (V), b. 121-35°, n_D²⁰ 1.5060, which retains some EtOH (2,4-dinitrophenylhydrazones, m. 130-2°, identical with the sample prepd. by the method immediately above). V (1.7 g.) heated with 0.9 g. powder KHSO₄ to 100° at 60

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m. 182° (from EtOH), and 2,4-dinitrophenylhydrazones, m. 172-3° (from EtOH), while treatment with Br-NaOH in the cold yields α -isopropyl- β -dimethylsuccinic acid, m. 136° (from H₂O). Oxidation of 20 g. III with 48 g. KMnO₄ in H₂O gave Me₂CO, iso-Pr₂CO, HCO₂H, and 2 isomeric 7,7-dimethyl-3- α -isopropyl- α , β -diketocarboxylic acids, m. 144° and 112-11°, resp. (from CCl₄-Et₂O). Stirring 40 g. II with 180 ml. 90% MeOH with gradual addn. H₂SO₄, and 3 g. H₂SO₄, 1.5 hrs. at 60° with gradual addn. of 3 g. H₂SO₄ gave 9 g. II and 8.5 g. 5-isopropyl-6-methyl-1,5-heptadim-4-one (V), b_p 88-8.5°, n_D²⁰ 1.4728, d₄²⁰ 0.8616 (semicarbazone, m. 139-1° (from EtOH)), as well as 2.5 g. 2-methoxy-5-isopropyl-6-methyl-3-hepten-4-one (IV), b_p 101°, n_D²⁰ 1.4558; increase of the reaction period to 5 hrs. or more increases the conversion of II and yields largely IV with traces of the above dienone. Pure IV, b_p 96-8°, n_D²⁰ 1.4558, d₄²⁰ 0.9134, loss MeOH in vacuo at 130°; the dienone heating with p-MeC₆H₄SO₂H in vacuo is also obtained, one by 51.5-5.0°; if the distn. in the above expt. is continued after the loss of MeOH over Pt oxide in MeOH hydrogenation of the dienone over Pt oxide in MeOH gave 6-methyl-5-isopropyl-3-hepten-4-one, complete 1.4456, d₄²⁰ 0.8339, from which a solid semicarbazone or 2,4-dinitrophenylhydrazones could not be obtained; aldehyde hydrogenation also failed. Oxidation of (apparently, aldehyde) with KMnO₄ gave Me₂CO, iso-Pr₂CO, (d. 1.76) 6 with KMnO₄ gave Me₂CO, iso-Pr₂CO, (d. 1.76) 6 though the semicarbazone m. 167°. PtCl₂Et₂ and iso-Pr₂COH. Stirring 2.6 g. V with 3 ml. H₂PO₄ (d. 1.76) 6 hrs. at 60-5° gave 2.1 g. III, b_p 92-3°, n_D²⁰ 1.4789; a similar result is obtained after 5 hrs. at 20°. Addn. of 100 ml. H₂PO₄ (d. 1.76) to 100 g. I with cooling and stirring 6 hrs. at 60-5° (spontaneous initial rise to 88°) gave 84 g.

III. The cyclization of V is a new typical cyclization of a vinylallyl ketone which lacks a free H in the vinyl group, thus causing cyclization to take place at the expense of the allyl H. The cyclization probably occurs by addn. of a H ion to the terminal allyl C, followed by ring closure via the positively charged 2nd C atom of the cyclopentenone. CIV. Heterocyclic compounds. 10. New synthesis of tetrahydro-1,4-thiapyrones by the action of hydrogen sulfide on vinyl allyl ketones. 1. N. Nazarov, A. I. Kuznetsova, and I. A. Gurvich. *Ibid.* 2148-63. — Passage of H₂S for 20 min. into 6 g. dry NaOAc in 200 ml. 90% EtOH with ice cooling, followed by addn. over 2.5 hrs. of 37 g. CH₂:CHCO. CH₂:CH:CH₂ (b_p 42-5°, n_D²⁰ 1.4690) with continued passage of H₂S for 1.5 hrs. at 0° after the addn. was complete, then letting the mixt. stand overnight, refluxing 7 hrs. with 4 g. NaOAc, concg., extg. with Et₂O, and distg. the ext. gave 14 g. 2-methyltetrahydro-1,4-thiapyrone, b_p 80-80°, n_D²⁰ 1.5052, and 22 g. polymeric matter; the pure thiapyrone b_p 82.5°, n_D²⁰ 1.5094, d₄²⁰ 1.0877; semicarbazone, m. 168° (from MeOH); oxidation with KMnO₄ and dil. H₂SO₄ in the cold gave the corresponding sulfone, m. 80° (from MeOH-C₆H₆). Similarly, 3.5 g. NaOAc in 140 ml. 90% EtOH treated at 0° (at room temp. the yield is lower) with H₂S and 18 g. CH₂:CHCH₂CO₂C₆H₅ (b_p 51-2°, n_D²⁰ 1.4712) let stand overnight, refluxed 14 hrs. with 22 g. NaOAc until the RMH color was eliminated, concd., and distd. with H₂O, gave 16 g. solid 2,5-dimethyltetrahydro-1,4-thiapyrone, while the residue on extn. with Et₂O gave a further amt. of the pyrone, b_p 87-8°, which partly crystal. on cooling; the total solid monomer (66%), presumably *trans*, m. 71° (from EtOH or

petr. ether) with a sharp odor; semicarbazone, m. 173-4° (from EtOH); 2,4-dinitrophenylhydrazones, m. 180° (from EtOH). Combining the residual liquids from the trans isomer sepn. gave on repeated distn. (from 147 g. crude) 16.5 g. liquid mixt. of the *cis* and *trans* isomers, b_p 94°, n_D²⁰ 1.4618, d₄²⁰ 1.0651, which formed a semicarbazone, m. 171-2°, giving no depression with the deriv. of pure *trans* isomer. Fractional crystn. of the 2,4-dinitrophenylhydrazones of the mixt., however, gave the deriv. of the *trans* isomer (see above) and that of the *cis* isomer, orange, m. 142-3° (from EtOH); the deriv. residues also yielded 16 g. 1,3-dimethyl-5-cyclopenten-2-one, b. 162.5°, n_D²⁰ 1.4051, formed by cyclization of the initial ketone. Boiling the liquid form of the thiapyrone with MeONa in MeOH 5 hrs. gave almost 90% of the *trans* isomer; the latter with KMnO₄ in dil. Me₂CO in the presence of dil. H₂SO₄ gave the corresponding sulfone, m. 138° (from EtOH), isolated from the aq. soln. Oxidation of the liquid mixt. of the thiapyrones gave from the aq. layer some sulfone identical with the above, while the EtO ext. gave the sulfone of the *cis* form, m. 103-4° (from EtOH). Boiling the *cis* sulfone in MeOH with a little MeONa 2 hrs. gave the *trans* sulfone. Passage of H₂S 20 min. into 0.4 g. NaOAc in 150 ml. ice-cooled Me₂CO and 1.5 ml. H₂O, followed by addn. of 14.5 g. CH₃CHCH₂COC(=CH₂)Me over 1 hr. with continued passage of H₂S 3 hrs. at 0°, addn. of 0.5 g. pyrogallol, letting stand overnight, and concg. the soln. *in vacuo*, gave upon extn. with Et₂O 7 g. 2-methylhexane-1,5-dithiol-3-one, b_p 98.5°, n_D²⁰ 1.5120, d₄²⁰ 1.0755, having a foul odor, giving a pos. SII test with HNO₃, and yielding glassy products with HgCN and C₆H₅CNO; boiling this dithiol with alc. NaOAc 4.5 hrs. gave much H₂S and the

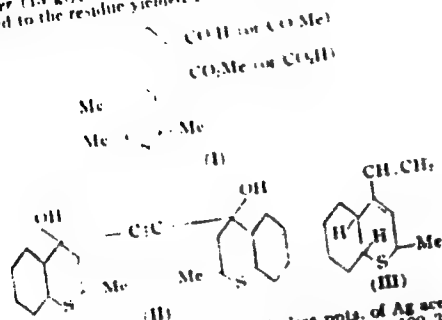
trans isomer of the thiapyrone described above, thus indicating that the dithiol is the intermediate product in its synthesis. Similarly 27 g. low-boiling isomer of MeCH₂CMcCOCH₂CH₂CH₃ (b_p 61.5°, n_D²⁰ 1.4720) with NaOAc in 90% EtOH and H₂S gave 64% 2,1,6-trimethyltetrahydro-1,4-thiapyrone, b_p 84-6°, n_D²⁰ 1.4900; the same reaction with 340 g. of the high-boiling isomer of the dienone (b_p 65-8°) gave 238 g. identical thiapyrone, b_p 79-80°, n_D²⁰ 1.4900, as well as 80 g. of a mixt. of the 2 isomeric forms, b_p 77-9°, the main product, on repeated distn., b_p 79°, n_D²⁰ 1.4961, d₄²⁰ 1.0288; semicarbazone, m. 173° (from EtOH); fractional crystn. of the semicarbazones formed from the monomer mixt. (above) gave a semicarbazone identical with the above and one m. 135° (from EtOH); the free thiapyrone of the latter was not isolated. Oxidation of the thiapyrone by KMnO₄ in dil. Me₂CO in the presence of H₂SO₄ gave the sulfone, m. 128° (b_p 118-22°). Similarly NaOAc and H₂S in dil. Me₂CO with 44 g. EtCH₂CMcCOCH₂CH₂CH₃ gave 67% 2,5-dimethyl-6-ethyltetrahydro-1,4-thiapyrone, b_p 81°, n_D²⁰ 1.4918, d₄²⁰ 1.0150; semicarbazone, m. 150.5° (from EtOH); oxidation (above) gave the sulfone, b_p 133°, n_D²⁰ 1.4960, which could not be crystal. Similarly, 20.5 g. EtCH₂CH₂CMcCOCH₂CH₂CH₃ gave 8.7 g. 2-methyl-3-propyl-6-ethyltetrahydro-1,4-thiapyrone, b_p 114°, n_D²⁰ 1.4962, d₄²⁰ 0.9894. Similar reaction of 97 g. allyl 1-cyclohexenyl ketone gave 34 g. solid 2-methylhexahydro-6-thiathromanone (*trans* isomer), m. 77.5° (from MeOH); semicarbazone, m. 203-3.5° (from MeOH); 2,4-dinitrophenylhydrazones, m. 221° (from CCl₄-petr. ether), and 30 g. liquid mixt. of *cis-trans* isomers, which yielded an

unisolated amt. of impure *cis* isomer, b_p 111°, n_D²⁰ 1.5270, d₄²⁰ 1.0578, forming a mixt. of 2,4-dinitrophenylhydrazones; sep'd. by crystn. from EtOH into the *cis* isomer; a colorless substance, m. 215°, was also isolated but not identified. Repetition of the synthesis with 120 g. ketone, 20 g. NaOAc, and 500 ml. 90% EtOH, H₂S passage as above, with refluxing for 32 hrs. after the addition, gave 10 g. mixed solid thiachromanones and 40 g. liquid fractions, fractional distn. and freezing of the liquid portions gave 1.8 g. pure *cis* isomer or its mixt. with the *trans* form in the pure *cis* isomer or its mixt. with the pure *trans* form. MeOH contg. a little MeONa gave the pure *cis* isomer; KMnO₄ oxidation of the *trans* comp'd. gave the corresponding sulfone, m. 137-8° (from EtOH); the latter gave the *cis* sulfone, m. 144° (from EtOH); the latter may be sep'd. from mixt. with the *trans* isomer by pptn. with petr. ether from CCl₄. Boiling the sulfones with a 0.15% soln. of MeONa in MeOH failed to effect isomerization; longer boiling or the use of higher MeONa concns. failed to decompose. It is interesting to note that while the *cis*-2-methylhexahydro-4-thiachromanone yields a 2,4-dinitrophenylhydrazone, m. 181°, distinct from that of the *trans* isomer, the semithiathiones formed from the *cis*-2-methylthiachromanones are identical and m. 202.5-3°.

CV. Heterocyclic compounds. 11. Synthesis of 4-ethynyltetrahydro-1,4-thiapyrones. *Ibid.* 2164-acetylene with tetrahydro-1,4-thiapyrones. KOH sat'd. aq. Et₂O (90 ml.) and 5.1 g. powd. KOH sat'd. aq. Et₂O (90 ml.) were treated in a continuous CCl₄ stream with 14 g. 2,5-dimethyltetrahydro-1,4-thiapyrone (m. 71°) in 70 ml. Et₂O over 1 hr.; after 3 hrs. of further treatment with CCl₄, the mixt. was sep'd. and the org.

layer washed with H₂O and dil. HCl until neutral, while the aq. layer was dil'd. and ext'd. with Et₂O; the combined org. layers gave 3 g. original thiapyrone and 5.8 g. 2,5-dimethyl-4-ethynyltetrahydro-1,4-thiapyran-4-ol, b_p 104°, n_D²⁰ 1.5250, d₄²⁰ 1.0680; this was hydrogenated over Pd-CaCO₃ in EtOH to the 4-Et analog, b_p 110-11°, n_D²⁰ 1.5140, d₄²⁰ 1.0444, also obtained in 88% yield (by 99-100%) from the thiapyrone and EtMgBr. Similarly, 18.1 g. 2,3,6-trimethyltetrahydro-1,4-thiapyrone gave 18.1 g. 2,3,6-trimethyl-4-ethynyltetrahydro-1,4-thiapyran-4-ol, b_p 102-103°, n_D²⁰ 1.5185, d₄²⁰ 1.0471, which gives the typical Ag acetate ppt. with NH₄AcO, while partial hydrogenation in EtOH over Pd gave the 4-vinyl analog, b_p 100-101°, n_D²⁰ 1.5148, d₄²⁰ 1.0220, and continued hydrogenation gave in 24 hrs. the 4-Et analog, b_p 100°, n_D²⁰ 1.5085, d₄²⁰ 1.0147; this, obtained from the thiapyrone and EtMgBr, b_p 100.6-7°, n_D²⁰ 1.5081, d₄²⁰ 1.0163. Distn. of 17.2 g. of the 4-vinyl comp'd. with 3 g. KHSO₄ at 150-60° at 17 mm. gave 3 g. unreacted alc. and 8.8 g. 2,3,6-trimethyl-4-vinyl-5-oxidihydro-1,4-thiapyran, b_p 85°, n_D²⁰ 1.5278, d₄²⁰ 0.9902; similar dehydration of 11.2 g. of the alc. with 0.35 g. p-MeC₆H₄SO₃Na at 160-70° gave 0.5 g. of the above diene; the latter heated with maleic anhydride to 180° for 1 hr. in CCl₄ in a sealed tube yielded the adduct, which with MeOH gave the comp'd. 1, m. 157° (from CCl₄-petr. ether); hydrogenation of the diene over Pd gave 2,3,6-trimethyl-4-ethynyltetrahydro-1,4-thiapyran, b_p 75-6° (?), n_D²⁰ 1.4970, d₄²⁰ 0.9355, which was not completely pure. Similarly CCl₄ with 16.8 g. KOH in 400 ml. Et₂O and 51 g. *trans*-2-methylhexahydro-4-thiachromanone in 200 ml. Et₂O gave 40.7 g. mixed isomers of 2-methyl-4-ethynyltetrahydro-4-thiachromanol, b_p 115-7°, n_D²⁰ 1.5100; treatment with EtOH gave the high-melting

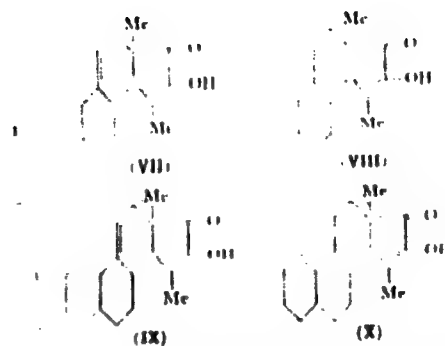
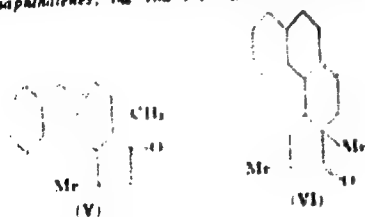
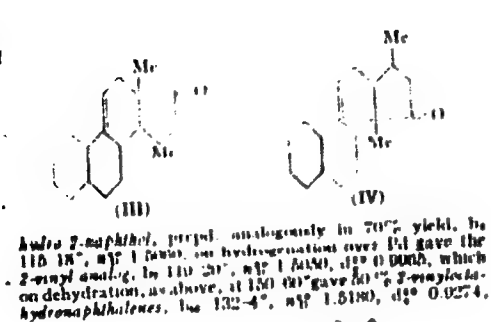
isomer (13 g.), m. 112° (from EtOH), while petr. ether added to the residue yielded 10.5 g. low-melting isomer, m.



66° (from ligroin); both give colorless ppts. of Ag acet-
 ylides with NH_4Ag solns. and on heating to 120-30°
 with alkali yield $\text{C}_{11}\text{H}_{14}$. The residual material after isola-
 tion of the isomeric thiachromanols gave with EtOH an
 unstated amt. of an acetylenic glycol, $\text{C}_{11}\text{H}_{16}\text{O}_2$, m. 221°
 (from EtOH), which does not give a test with NH_4Ag ;
 it probably has the structure II. Hydrogenation of the
 high-melting ethynylthiachromanol over Pd gave the high-
 melting isomer of the 6-vinyl analog, m. 94° (from EtOH).
 while the low-melting isomer, m. 76° (from ligroin), by
 185-6°, was similarly obtained from the low-melting
 ethynylthiachromanol. Complete hydrogenation sim-
 ilarly gave the high-melting isomer of the 6-Et deriv..

by 148°, m. 55° (from petr. ether), and the low-melting
 isomer, which does not freeze at -10°, b. 154°, n_D 1.5291.
 Oxidation of the former with KMnO_4 with cooling gave the
 sulfone, $\text{C}_{11}\text{H}_{12}\text{O}_2\text{S}$, m. 140° (from C_6H_6 -ligroin), while the
 low-melting isomer gave a sulfone m. 176° (from C_6H_6).
 Treatment of 10 g. trans-2-methylhexahydro-4-thia-
 chromanone (10 g.) with EtMgBr (from 7.8 g. EtBr)
 gave 9 g. of the 4-ethyl-4-thiachromanol, m. 55°, identical
 with the above-described. Dehydration of the high-
 melting 4-vinyl alc. with p-Me $\text{C}_6\text{H}_4\text{SO}_3\text{H}$ at 140° in vacuo
 gave the diene (III), b. 140-1°, n_D 1.5507, d₄ 1.0312;
 which boiled with H_2O gave the diene, b. 138°
 similarly the low-melting isomer gave the diene an-
 41°, n_D 1.5405; either diene warmed with maleic an-
 hydride gave the adduct, m. 154° (from C_6H_6 -petr. ether).
 which boiled with H_2O gave the corresponding dibasic
 acid, $\text{C}_{11}\text{H}_{12}\text{O}_4$, isolated as the dihydrate, m. 208°. C₁₁
 Heterocyclic compounds. Condensation of 4-(vinyl-6-
 ethynyl)tetrahydrothiapyran-4-ol. *Ibid.* 20, 370-81
 (1950).—Addn. of 20 g. $\text{CH}_3\text{C}\equiv\text{CH}$, CH_3CH and 36 g. 2,2-
 dimethyltetrahydro-1,4-thiapyrone (I) in 60 ml. Et₂O to
 15 g. powd. KOH in 20 ml. Et₂O at 0°, followed by an-
 addn. stirring 8 hrs. at 0° and 1 hrs. at room temp., gave
 22 g. 2,2-dimethyl-4-(vinylethynyl)tetrahydrothiapyran-
 4-ol (II), b. 131-2°, n_D 1.5154, d₄ 1.0521, also obtained,
 b. 122-3°, n_D 1.5158, m. 82°; yield from the vinylacetylene
 Grignard reagent and the thiapyrone. The pyranol
 heated in vacuo with KHSO_4 (with pyrogallol) gave 2,2-
 dimethyl-4-vinylethynyl-3,6-dihydro-1,2H-thiapyran, b.
 110.5-11.5°, n_D 1.5656, d₄ 0.9917, which on hydrogenation
 over Pt-CaCO₃ gave the 4-butyl-2,2-dimethyltetra-
 hydrothiapyran, b. 110-10.5°, n_D 1.4895, d₄ 0.9167.
 BuMgCl (from 11.5 g. BuCl) treated with I gave 60% 2,2-

[illegible][illegible]



which on condensation with maleic anhydride gave an adduct, decomp. 116-17°, probably a mixt. of 3'-decahydro-1,2-anthracenedicarboxylic anhydride and 3'-decahydro-5,8-phenanthrenedicarboxylic anhydride. heating the mixed dienes (14 g.) with 25 g. I and 0.4 g. pyrogallol 6 hrs. to 198-200° in a metal ampul gave 27 g. unreacted matter and 4 g. condensate, tetracyclic ketone (V or VI). bp 186-6°, n_D²⁰ 1.5200, d₄²⁰ 1.0384; hydrogenation over Pt in EtOH gave the solid analog, C₁₈H₁₆O, bp 156-5°, n_D²⁰ 1.5220, repeated fractionation of the condensation mixt

pure III, b_p 141.6°, n_D²⁰ 1.4801; semicarbazone, m. 226.7° (from MeOH). Condensation of 13 g. cyclohexyl hexahydrobenzyl ketone and 11 g. CH₂:CHC:CH with 13 g. KOH in cold Et₂O gave after 24 hrs. 9 g. cyclohexyl(hydrobenzyl)vinylethynylcarbinol, b_p 157.9°, n_D²⁰ 1.5167, d₄²⁰ 0.9791 (also obtained in 58-g. yield by the Grignard reaction from 48 g. CH₂:CHC:CH, 10 g. Mg, 55 g. EtBr, and 57 g. of the above ketone). The carbinol on hydrogenation over Adams catalyst gave butylcyclohexyl(hydrobenzyl)carbinol, b_p 120.33°, n_D²⁰ 1.4920, d₄²⁰ 0.9471, while stirring with stumpy H₂PO₄ 5 hrs. at 60-5° gave 35% 5,6-dicyclohexyl-1,3-hexadien-3-yne (IV), b_p 135-7°, b_m 124-6°, n_D²⁰ 1.5310, d₄²⁰ 0.9331; the same is obtained by using 60% H₂SO₄, but KHSO₄ is ineffective. The hydrocarbon upon hydrogenation over Adams catalyst in AcOH gave 1,2-dicyclohexylhexane, b_p 111-13°, n_D²⁰ 1.4850, d₄²⁰ 0.8917, while stirring 15 hrs. at 60-5° with aq. MeOH and a trace of H₂SO₄ (melt. with H₂SO₄ (as described above) gave 50% 5,6-dicyclohexyl-1,3-hexadien-4-one, b_p 143-5°, n_D²⁰ 1.4842, d₄²⁰ 0.9013, very easily oxidized by air and forming the 2,4-dinitrophenylhydrazones, m. 60-5°, hydrogenation of this ketone over Adams catalyst in AcOH gave 5,6-dicyclohexyl-4-hexanone, b_p 122-4°, n_D²⁰ 1.4912, d₄²⁰ 0.9550, while stirring 5 hrs. with H₂PO₄ (d. 1.81) at 70-5° gave 1,2-dicyclohexyl-3-methyl-1-cyclopenten-3-one, b_p 142-3°, n_D²⁰ 1.5225, d₄²⁰ 0.9073, which gives 2 isomeric 2,4-dinitrophenylhydrazones, m. 130.7° and 190° (from MeOH), and which cannot be hydrogenated in AcOH over Pt; this ketone cannot be prepd. by cyclization of IV with H₂PO₄. Ozonization of this ketone gave cyclohexanecarboxylic acid, b_p 139.9°, m. 21.2°, and a solid, m. 162°, b_p 170-84°, possibly the keto acid C₁₂H₂₀COCH₂MeCH₂CO₂H. CH₃. Mechanism of hydration and cy-

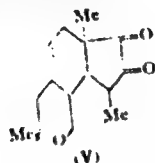
cyclization of dienes. 21 Hydration of 5-isopropyl-6-methyl-1,5-heptadien-3-yne to 5-isopropyl-6-methyl-1,5-heptadien-4-one and its cyclization to 1-isopropyl-2,2,3-trimethyl-3-cyclopenten-3-one. New case of cyclization of substituted vinyl allyl ketones without a free hydrogen atom in the vinyl radical. 1. N. Nazarov and I. N. Pinkins. *Ibid.* 1950-81. -Powd. KOH (132 g.), 270 ml. dry Et₂O, and 50 g. CH₂:CHC:CH treated at -5° with 180 g. iso-Pr₂CO and 115 g. CH₂:CHC:CH in 480 ml. Et₂O over 2 hrs., followed by stirring in the cold 5 hrs. and standing overnight with addnl. stirring 5 hrs., gave 170 g. diisopropyl(mulethynyl)carbinol (II), b_p 78°, n_D²⁰ 1.4778, d₄²⁰ 0.8859, which polymerizes on standing. 1 (10 g.) hydrogenated over Pt oxide in AcOH gave butyl-diisopropylcarbinol, b_p 85°, n_D²⁰ 1.4453, d₄²⁰ 0.8490. Stirring 50 g. I with 50 g. 60% H₂SO₄ 40 min. at 60° gave 35.5 g. 6-methyl-5-isopropyl-1,5-heptadien-3-yne (II), b_p 64-5°, n_D²⁰ 1.5010, d₄²⁰ 0.8210 (polymerizes on standing), and 2.5 g. 2,2,3-trimethyl-1-isopropyl-3-cyclopenten-3-one (III), b_p 95-7°, n_D²⁰ 1.4765; semicarbazone, m. 199°. Hydrogenation of II over Pt oxide in AcOH gave 6-methyl-5-isopropylheptane, b_p 172-3°, b_m 51.5-52.0°, n_D²⁰ 1.4212, d₄²⁰ 0.7525. II (7.4 g.) stirred 7 hrs. at 60° with 7.5 ml. H₂PO₄ (d. 1.76) gave 6.6 g. III, b_p 100°, n_D²⁰ 1.4778, d₄²⁰ 0.8295; semicarbazone, m. 201.5° (from EtOH). 2,4-dinitrophenylhydrazones, m. 128° (from EtOH). Hydrogenation of III over Pt oxide in AcOH gave 2,2,3-trimethyl-1-isopropyl-3-cyclopentanone, b_p 90-12°, b_m 78-80°, n_D²⁰ 1.4548, d₄²⁰ 0.8026; semicarbazone, m. 180.5°. Ozonization of III gave iso-Pr₂CO, α-isopropyl-3,4-dimethyllevulinic acid, b_p 121°, n_D²⁰ 1.4642, HCO₂H, and AcOH; the above levulinic acid, m. 48° (after prolonged freezing and washing with EtOH), yields a semicarbazone.

dimethyl-4-butyldihydrothiopyran-6-ol, b. 128°, n_D²⁰ 1.4985, d₄²⁰ 0.9880. Hydrogenation of II over Pd in EtOH gave only impure 4-Bu deriv. of the tetrahydro analog. as H absorption stopped before completion of the reaction. Reaction of RMgBr (from 30 g. CH₃:CHC(CH₃)H) with 5.8 g. 2,5-dimethyltetrahydro-1,4-thiopyrone in Et₂O with 8 hrs. refluxing, gave 2,5-dimethyl-4-(vinylethynyl)tetrahydrothiopyran-6-ol, b. 129°, m. 62.5-64.0° (from petr. ether), along with the geometrical isomers (total wt. 0.8 g crude mixt. m. 32-37°). The product (m. 62-64°) (15 g) heated to 165-70° with p-MeC₆H₄SO₃H in vacuo gave 3.3 g 11°, n_D²⁰ 1.5712, d₄²⁰ 0.9983, which is unstable. The above ketone and BuMgCl gave 10° 2,5-dimethyl-4-butyldihydrothiopyran-6-ol, b. 140°, n_D²⁰ 1.5015, d₄²⁰ 0.9982. RMgBr (from 20 CH₃:CHC(CH₃)H) with 23 g. 2,3,6-trimethyl-6-(vinylethynyl)tetrahydrothiopyran-6-ol, b. 155-6°, to 200° gave 10° 2,3,6-trimethyl-4-(vinylethynyl)tetrahydrothiopyran-6-ol, b. 146-7°, n_D²⁰ 1.5000, d₄²⁰ 0.9916. Similar reaction with RMgBr from 10 g. CH₃:CHC(CH₃)H and 22 g. 2-methyl-6-(vinylethynyl)hexahydrothiachroman-6-ol, viscous material, b. 126°, n_D²⁰ 1.5255, d₄²⁰ 1.0300, which, dehydrated over p-MeC₆H₄SO₃H at 140° in vacuo, gave 50% of the corresponding tetrahydrothiachroman, yellow, b. 156°, n_D²⁰ 1.5790, d₄²⁰ 1.0330. The above chromanone and BuMgBr gave 25° 2-methyl-4-butyldihydrothiachroman-6-ol, m. 79-80°, b. 153-6°. CVII. Synthesis of polycyclic compounds related to steroids. 4. Diene condensation of 1,3-dimethyl-1-cyclopenten-3-one and

1,3-dimethyl-1-cyclopenten-4,5-dione with 1. and 2. vinylcyclohexanophthalones. I. N. Nazarov and T. D. Naghina, *Ibid.* 531-8. 1,3-Dimethyl-1-cyclopenten-5-one (I), b. 164-6°, n_D²⁰ 1.4923, was obtained by cyclization of CH₃:CHCH₂COC(CH₃)Me (cf. C 1 39, 1659) was obtained by SeO₂ oxidation of dimethylcyclopentenone (cf. part CI, above) from 1,4-cyclohexadiene (1.21) naph added in 3 hrs. to 21 g. powder, KOH in 500 ml. Et₂O at 16° with water, by C₆H₅Li, let stand overnight, and by naphthalol, b. 105-7°, n_D²⁰ 1.5000, d₄²⁰ 1.0000; this hydrolyzed with H₂O, gave 37 g. 1-ethynylcyclopenten-1-one, b. 118-19°, n_D²⁰ 1.5040, d₄²⁰ 0.9915, which (28 g.) heated with 14 g. powder, KHSO₄ in a N stream at 34 mm to 150-60° gave 15 g. 1-vinyl-3-ethynylcyclopenten-1-one, b. 104-5°, n_D²⁰ 1.5170, d₄²⁰ 0.9900; its adduct with maleic anhydride, m. 139°, heating 7 g. diene and 21 g. 1.7 hrs. to 180-90° gave 23 g. unreacted matter and 1 g. condensation products, b. 170-8°, n_D²⁰ 1.5120, from which, after repeated crystallization from MeOH, was isolated 2 g. mixed ketones (III and IV), m. 72-88°; on further crystallization was isolated a homogeneous ketone, either III or IV, m. 112-3°, which failed to yield a semicarbazone; redistn. of the mother liquor gave 1 g. product, b. 179-82°, which yielded 0.5 g. of the other ketone (IV or III), m. 70-2°, whose 2,4-dinitrophenylhydrazone, m. 204-14 (from EtOH); 2-Ethynylcyclopenten-1-one

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on IV. Analogous condensation of I with 1,3-dimethyl-3-cyclopenten-5-one gave a poor yield of condensation product, b_p 132-4°, badly contaminated with I dimer. Heating 1,3-dimethyl-1-cyclopenten-5-one (36 g.) with 37 g. of 1,3-dimethyl-1-cyclopenten-5-one (36 g.) with cooling to moderate S₂ in 46 g. AcOH to 100-10° (with cooling to moderate the action), then refluxing 0.5 hr., gave 13.7 g. 1,3-dimethyl-1-cyclopenten-4,5-dione, b_p 85-105° (crude), m. 63-4° (pure product, m. 67°); quinoxaline deriv., m. 253-4° (decompn.). The diketone (6.5 g.) heated with 7.6 g. I in dry dioxane 10 hrs. to 120-5° gave 4.1 g. of a compd. (V), m. 169-70° (from C₆H₆), sol. in 3-5% KOH,



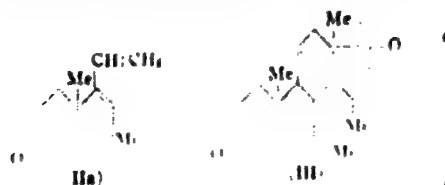
pptd. unchanged on acidification; hydrogenation over Adams Pt catalyst in AcOH gave the satd. analog (VI), m. 129.5-30° (from EtOH). CII. Mechanism of hydration and cyclization of di(1-cyclohexen-1-yl)acetylene and 1,2-cyclization of di(1-cyclohexen-1-yl)acetylene and 1,2-dicyclopentyl-1,3-hexadien-3-ene. I. N. Nazarov and S. Bakhmutskaya. *Ibid.* 1777-66. — Passage of 20 l. S₂ into 1 l. EtOH contg. 70 g. powd. KOH simultaneously with addn. of 105 g. cyclohexanone with ice cooling and letting stand overnight gave, upon the usual treatment, 65

g. di(1-cyclohexen-1-yl)acetylene, which on heating with KHSO₄ to 145-55° in a N stream gave 11 g. di(1-cyclohexen-1-yl)acetylene (I), b_p 125-8°, n_D²⁰ 1.5673; this (110 g. 1.00 g. 90% aq. MeOH, 1 ml. concd. H₂SO₄, and 8 g. H₂SO₄, stirred 4.5 hrs. at 60-5° with gradual addn. of 21 g. H₂SO₄, gave 98 g. 1,2-di(1-cyclohexen-1-yl)ethanone (III), b_p 128-30°, n_D²⁰ 1.5347, d₄²⁰ 1.0071; semicarbazone, m. 172-3° (from MeOH). Hydrogenation of II over Adams Pt catalyst in EtOH gave cyclohexyl hexahydrobenzyl ketone, b_p 110-12°, n_D²⁰ 1.4860, d₄²⁰ 0.9500, semicarbazone, m. 186-7° (from MeOH); oxime, m. 114° (from MeOH). II (5 g.) and 5 ml. H₂PO₄ (d. 1.77) stirred 6 hrs. at 60° gave 3.8 g. of the spiro compd. (III), b_p 120-1°, n_D²⁰ 1.5204; its semicarbazone, m. 218°, was identical with that of the



ketone reported by Marvel, *et al.* (C.I. 33, 1955). Heating I (28 g.) with 280 g. HCO₂H 10 hrs. at 55-60° gave 21.5 g. mixed ketones (described by Marvel *et al.* as b_p 116-19°, the semicarbazone of which also m. 218-19°) and was identical with the above product; the spiro deriv. apparently predominates in the ketone mixt. obtained by either method. The "Marvel" ketone mixt. (22 g. heated 3 hrs. with 20 ml. cryst. H₂PO₄ to 150° gives 12 g.

numbering), m. 182-3° (from C₆H₆-petr. ether), which boiled 2 hrs. with 3% HCl gave the free acid, m. 266-8° (decompn.; from dil. EtOH), while boiling with EtOH gave the mono-*Et* ester, m. 140-1° (from EtOH). Maleic anhydride replaced by an excess of 1,3-dimethyl-1-cyclopenten-3-one, 6 hrs. at 150° (60 in a metal ampul yields 0.6 g. (60%) diketone (III), bp. 155-60°, n_D²⁰ 1.5001 (monomer), decomp. 212-13°. 1,3-Dimethyl-1-cyclopenten-3-one (10 g.) in 10 ml. AcOH heated with 10 g. Se to 120° reacted vigorously, yielding 45% 1,3-dimethyl-1-cyclopenten-4,5-dione, bp. 108-11°, m. 68-69° (from C₆H₆-petr. ether) [mono(2,4-dinitrophenylhydrazones), m. 184.5-5.5° (from EtOH; decompn.)]. Heating this dione (0.7 g.) with 4 g. CH₃C(OMe)CH=CH₂ in dioxane (with pyrogallol) 3 hrs. at 120° gave 0.6 g. 7,7a-dimethyl-1,2,5-hydrundactriene, yellow mass, bp. 125-8°, which slowly solidified over P₂O₅ and m. 126-9°



from hexane); its mono-2,4-dinitrophenylhydrazone, m. 179-5° (from EtOH). Part. C₁CV translated into English appear in *J. Gen. Chem.* USSR 19, No. 10, 211-22, 223-31, No. 10, 230-11, No. 12, 621-6, 637-47, 1949), resp. G. M. Kozlovskii

--- TEREKHOVA, L. N.

I. N. Nazarov, L. N. Terekhova, and L. D. Bergel'son - "Acetylene derivatives. 109. Synthesis of polycyclic compounds related to the sterols. VI. Complete synthesis of the isomer of 15-methylandrosten-3. 17 dione with methylcyclopentane ring B." (p. 661)

SO: Journal of General Chemistry, (Zhurnal Obshchei Khimii), 1950, Vol. 20, No. 1.

7, L. N.

Chemical Abst.
Vol. 48 No. 9
May 10, 1954
Organic Chemistry

② Chem
Acetylene derivatives. CXXVI. Synthesis of polycyclic compounds related to steroids. 14. Synthesis of tetracyclic ketones with a methylcyclopentane B ring. I. N. Nazarov, V. R. Kocherov, and L. N. Terekhova. *Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci.* 1952, 427-35 (Engl. translation).—See C.A. 47, 5306c. CXXVII. Synthesis of polycyclic compounds related to steroids. 15. Structure of products of condensation of 2-methoxy-1,3-butadiene with 2-methyl-2-cyclohexen-1-one and methyl methacrylate. I. N. Nazarov and S. I. Zatyvalov. *Ibid.* 643-7.—See C.A. 47, 10515d. CXXVIII. Heterocyclic compounds. 27. Action of primary aromatic amines and 2-amino-pyridine on vinyl allyl ketones. Synthesis of aryl substituted 4-piperidones and 1-(2-pyridyl)-4-piperidones. I. N. Nazarov, S. O. Malkovan, and V. A. Rudenko. *Ibid.* 923-32.—See C.A. 48, 1357d. CXXIX. Heterocyclic compounds. 24. Transformations of 1-phenyl-2,5-dimethyl-4-piperidone. *Ibid.* 933-7.—See C.A. 48, 1358c. H. L. H.

L 08705-67 EWT(1) JK
ACC NR: AP6034132

SOURCE CODE: UR/0297/66/0110/010/0901/0906

AUTHOR: Terekhova, L. P.

ORG: Division of Microbiology /Director-Prof. G. F. Gauze/; Institute for Research on New Antibiotics, Ministry of Health, SSSR, Moscow (Otdel mikrobiologii Instituta po izyskaniyu novykh antibiotikov Ministerstva zdravookhraneniya SSSR)

TITLE: Antibiotic substances formed by actinomycetes which induce formation of mature phage particles in lysogenic cultures of *Micrococcus lysodeikticus*

SOURCE: Antibiotiki, v. 11, no. 10, 1966, 901-906

TOPIC TAGS: antibiotic, fungus antibiotic, lysogenic culture, bacteriophage, bacteriophage particle, ~~antibiotic~~

ABSTRACT: Of 625 actinomycetes cultures, 34 (5.4%) induced phage-particle formation in lysogenic cultures of *Micrococcus lysodeikticus*. It is suggested that this method be used for preliminary screening of actinomycetes strains to detect those which produce inducing substances. Screening tests also revealed that culture fluids of most of the strains possessing inducing properties inhibited growth of tumor cells in vitro.

Card 1/2

UDC: 615.779.931-017.717-012:576.852.18

L 08705-67

ACC NR: AP6034132

Ninety-eight percent of the cultures were bacterial antagonists but no.
correlation of inductive and antibacterial properties was noted. Orig.
art. has: 3 tables. [W.A. 50]

SUB CODE: 06/ SUBM DATE: 24Nov65/ ORIG REF: 004/ OTH REF: 006

Cord 2/2 nst

L 01299-67 ENT(m)/ENP(t)/ETI IJP(c) JD

ACC NR: AP6003326

SOURCE CODE: UR/0365/66/002/001/0090/0094

AUTHOR: Marchenko, N. A.; Terekhova, L. S.

ORG: Kharkov Polytechnical Institute (Khar'kovskiy politekhnicheskiy institut)

TITLE: Electrolytic deposition of indium from tartrate electrolyte

SOURCE: Zashchita metallov, v. 2, no. 1, 1966, 90-94

TOPIC TAGS: indium, electrolytic deposition, electrolyte, titrimetry, electric conduction

ABSTRACT: The studies of the curves of potentiometric titration, the effect of concentration changes on the deposition of indium from electrolyte of the $\text{In-NaHC}_4\text{H}_4\text{O}_6$ system, and the changes of electric conductivity as a function of concentration of NH_4OH and the addition of NaCl , resulted in a determination of the following optimal composition of the electrolyte: 20 g/l of metallic indium (in the form of $\text{In}_2(\text{SO}_4)_3$), 200 - 250 g/l of sodium bitartrate, 40 g/l of $(\text{NH}_4)_2\text{SO}_4$, 60 - 80 g/l of NaCl , and 250 ml/l NH_4OH (25%) at a current density of 0.5 - 2.5 amp/dm², a room temperature of 20°C, and a pH of 9 - 10.5. The specific electric conductivity of this electrolyte was 0.1087 ohm⁻¹cm⁻¹, and the rate of deposition of indium was 13 - 20 μ/hr. The throwing power of the electrolyte was determined from the weight of the metal deposited on two cathodes situated 93 and 46.6 mm, respectively, from the anode. It was compared with the throwing power of a sulfate electrolyte containing 20 g/l of indium (in the

Card 1/2

UDC: 621.357,7 : 669.87

L 01299-67

ACC NR: AP6003326

form of $\text{In}_2(\text{SO}_4)_3$ and 12 g/l of Na_2SO_4 . The throwing power of the tartrate and sulfate electrolyte was 40-50% and 10-11% respectively. The cathode and anode current efficiency as a function of current density were determined with a coulometer. It showed that the cathode current efficiency was 85-95%. It decreased with increased current density. This indicated a good throwing power of the electrolyte. The anode current efficiency, recalculated for In^{3+} was >100% in all cases. Fine-crystalline, dense, light-colored coatings were deposited at current densities of 0.5-2.5 amp/cm². The deposits had a good adhesion to metallic substrates of copper, brass, steels, and stainless steel with a coating thickness of 10 μ . The rapid plotting of polarization curves revealed the presence in solution of several types of ions capable of discharging at corresponding electrode potentials. Polarization curves were plotted by the same method in sulfate electrolyte containing the same amount of indium (20 g/l of metallic indium). The curves indicated the predominance of diffusion kinetics already at small current densities. At $\phi = 1.1$ v, the liberation of hydrogen was the main process. The experimental value of the equilibrium potential and its value, calculated by assuming the presence of simple hydrated ions were very similar: -0.341 and -0.351 v, respectively. The equilibrium potential of indium (experimental) in the tartrate electrolyte studied was -0.51 v. Orig. art. has: 6 fig.

SUB CODE: 11/07/SUBM DATE: 06May65/ ORIG REF: 004

Card 2/2 LC

MARCHENKO, N.A.; TEREKHOVA, L.S.

Electrolytic deposition of indium from a tartrate electrolyte.
Zashch. met. 2 no.1:90-94 Ja-F '66. (MIRA 19:1)

1. Khar'kovskiy politekhnicheskii institut. Submitted May 6,
1965.

TEREKHOVA, M. F.

TEREKHOVA, M. F.: "School Traditions and Their Significance in the Communist Training of Children." Kiev State U imeni T. G. Shevchenko. Kiev, 1956. (Dissertation for the Degree of Candidate in Pedagogical Science)

So: Knizhnaya Letopis', No. 19, 1956.

TEREKHOVA, M. G.

USSR/Chemistry - Adsorbents
Chemistry - Carbons, Active

Jan 1948

"Adsorption Properties and the Structure of Adsorbents: II, Adsorption in Active Carbon Solutions of Widely Varying Concentrations," O. M. Dubigit, A. V. Kiselev, M. G. Terekhova, E. B. Shcherbakova; Moscow State U; Lab of Adsorption, Acad Sci USSR; Inst of Phys Chem, Moscow, 11 pp

"Zhur Fiz Khim" Vol XIII, No 1

Study general types of adsorption isotherms of surface active substances found in solutions of weak adsorbent soluble materials. Adsorption of mixtures of water and acid or alcohols passes through maximum and decreases. Subdivision and cyclization of the adsorbent molecules decreases the degree to which they can fill the micropores of the carbon being studied. Submitted 14 May 1947.

PA 65TS

Dissertation: "Obtaining Ethyl Alcohol on the Base of Electrocracking of Petroleum Products."
Cand Chem Sci, Moscow Order of Lenin State University L. V. Lomonosov, 26 May 54,
Vechernyaya Moskva, Moscow, 19 May 54.

SO: SUM 284, 26 Nov 1954

"APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755320013-4

APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755320013-4"

84243

S/076/60/034/009/001/022
B015/B056

11. 1120
AUTHORS:

Kobozev, N. I., Yereimin, Ye. N., Terekhova, M. G., and
Mal'tsev, A. N.

TITLE:

Physical Chemistry of Concentrated Ozone. IX. Study of
Ozone Adsorption on Silica Gel at Various Temperatures

PERIODICAL:

Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 9, pp. 1893
-1899

TEXT: The adsorption of ozone on silica gel at low temperatures (from -80° to -150° C) was investigated by saturating the silica gel in the gas flow at constant temperature until adsorption equilibrium was established, and the adsorbed gas quantity was then determined by gas analysis. The ozone-oxygen mixture was produced in a silent electrical discharge; the duration of adsorption amounted to 1 - 6 h as a function of the experimental temperature, and the rate of flow of the gas was 43-45 l/h. The experiments were carried out in a circulating apparatus (Fig. 1). The silica gel was in an adsorber cooled with liquid nitrogen (Figs. 2, 4). The latter was cooled in a cryostat (Fig. 3), whereas for

Card 1/2

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Physical Chemistry of Concentrated Ozone.
IX. Study of Ozone Adsorption on Silica Gel
at Various Temperatures

S/076/60/034/009/001/022
B015/B056

the purpose of desorption, the cryostat was heated. The results of measurement show (Table 1) that ozone adsorption on silica gel rises to 7 to 8 times its amount with a temperature drop from -120°C to -150°C . Ozone desorption may thus be attained by a slight increase of temperature, or an effective separation of concentrated ozone with the aid of an adsorption-desorption cycle. For the temperatures of -120° , -130° , -140° , and -150°C the adsorption isothermal lines were obtained (Fig. 5), and it was found that they differ in appearance as well as according to the character of the dependence of adsorption on an increase of the ozone content in the equilibrium mixture. There are 5 figures, 2 tables, and 4 non-Soviet references: 3 German and 1 Swiss.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 15, 1958

Card 2/2

TEREKHOVA, N. Ya. Engr.

The experimental work of gear-cutting machine operator, L. Ya. Khzheushnevich

Vest Mash p. 45, Oct 51

TEREKHOVA, M. YA.

Gear-cutting machines

Work of gear-cutter L. YA Khzheushnevich. Vest. Mash. 31 No. 10, 1951.

9. Monthly List of Russian Accessions, Library of Congress, September, 1952, 1953. Unclassified.

USSR/Medicine - Brucellosis

Nov/Dec 51

"Dynamics of Vascular Reflexes in Brucellosis Patients," N. A. Terekhova, Chair of Pathol Physiol, Kuybyshev State Med Inst

"Arkh. Patol" Vol XIII, No 6, pp 16-21

The following abnormal vascular reflexes were encountered in sufferers from brucellosis: pathol instability of vascular tonus, which decreases after administration of luminal; frequent pressor reaction to heat; frequent vasodilative response to irritation by cold, long-lasting aftereffects of reactions upon unconditional irritants; in some cases slowness of reactions, disappearing only upon

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USSR/Medicine - Brucellosis
(Contd)

Nov/Dec 51

administration of caffeine. A reversion of a series of induced unconditional vascular reflexes due to sudden increase of pathol instability occurred at the peak of reaction to injection of brucellosis vaccine; easy setting-in of neurotic conditions as a reaction to "outside events" Forloy ("Sshibka"); long-lasting aftereffect from conditional reflex spasms of the blood vessels

202176

TEREKHOVA, N. A.

FIELDS, P., ed.; HEMINGWAY, V., ed.; TARASEVICH, L.M.[translator];
TEREKHOVA, N.A. [translator]; RYZHKOV, V.L., redaktor; ENDEW, M.G.,
redaktor; GABASIMOVA, Ye.S., tekhnicheskiy redaktor

[The nature of virus multiplication. Translated from the English]
Priroda razmnozheniia virusov. Sost. gruppoi avtorov. Perevod s
angliiskogo L.M.Tarasevich i N.A.Terekhovo. Pod red. is predisl.
V.L.Ryzhkova. Moskva, Izd-vo inostrannoi lit-ry, 1956. 390 p.
(MLRA 9:7)

1. Chlen-korrespondent AN SSSR (for Ryzhkov)
(VIRUSES)

TEREKHOVA, N. A.

"Concerning the Cultivation of Tobacco Mosaic Disease in Tumors Caused by Bac. *Tumefaciens*," a paper presented at the Conf. of Young Specialists, Inst. Microbiology, AS USSR, Mikrobiol., 25, No.1, p. 134, 1956

Translation U-8982, 9 Oct 56

TEREKHOVA N.A.

✓ Proliferation of tobacco mosaic-disease virus in bacterial
culture of tobacco plants

1

TEREKHOVA, N.A. (Moskva)

~~XXXXXXXXXXXXXXXXXXXX~~
New discoveries about plant tumors. Usp.sovr.biol. 41 no.2:246-250
(MIRA 9:8)

Mr-Apr '56.

(GALLS (BOTANY))

USSR/General Problems of Pathology - Pathophysiology of the
Infectious Process

U.

Abs Jour : Ref Zhur - Biol., No 2, 1959, 8671

Author : Terekhova, N.A.

Inst : Kuybyshev Society of Pathologists

Title : The Problem of Sensitivity of the Cerebral Cortex to
Dysentery Antigen

Orig Pub : Sb. nauchn. rabot Kuybyshevsk. o-va patologoanatomov s
seksiey patofiziol. Kuybyshev, 1957, 77-80

Abstract : Experiments performed on 4 dogs according to the method
of conditioned salivary reflexes. In all the animals the
type of higher nervous activity was determined. Hundred-
ths and thousandths of a mg/kg of dysentery antigen in-
jected I.V. produced a reduction of the positive condition-
ed reflexes in dogs of the strong type, phasic states

Card 1/2

- 13 -

COUNTRY : USSR
 OUT CTRY : Plant Diseases. Diseases of Cultivated Plants.
 No. 15/72

REF. JOUR. : REF ZHUR. 3:01001YA, NO. 4, 1959.

AUTHOR : Terekhov, N.A.
 INST. : Inst. of Microbiology AS USSR
 TITLE : Influence of degeneration processes on development of tumorescence caused by bacterium tumefaciens in tomatoes.

ORIG. PUB. : Fiziol. rasteniy, 1967, 4, No.1, 72-76

ABSTRACT

: At the Institute of Microbiology of the Academy of Sciences of the USSR in experiments with tomato slices there was found to be a relation between tumor growths and the level of meristematic growth, a normal inheritance of the plant. Root development of the severed cuttings infected with bacteria inhibited the formation of tumors. But there was not noted any delay at first in tumor formation with removal of the root in

CARD:

1/2

7

2

CATEGORY : Plant Physiology. Pathophysiology.

ARS. JOUR. : RZhSitol., No. 5, 1959, No. 19999

AUTHOR : Ryzhkov, V.L.; Terekhov, N.A.

INST. : AS USSR

TITLE : Mucopolysaccharide in leaves of Abutilon sp.

ORIG. PUB. : Dokl. AN USSR, 1957, 117, No.2, 341-344

ABSTRACT : A study of mucopolysaccharides (M) in the leaves of healthy and chlorotic Abutilon striatum plants was made at the Institute of Microbiology of the Academy of Sciences USSR. Healthy Abutilon pictum plants were also studied. By qualitative tests it was determined that the acid M contains amino-sugar and uronic acids. M is found in special parenchyma cells of the leaf veins and in its epidermis. The veins of A. striatum are richer in mucilage than the pith.

END: 1/2

TESEKHOVA, H.A.

Effect of metabolites and antimetabolites on plant tumors.

Izv.AN SSSR.Ser.biol. no.3:431-437 My-Je '59. (MIRA 12:9)

1. Institute of Microbiology, Academy of Sciences of the U.S.S.R.,
Moscow.

(GALLS (BOTANY)) (PLANTS, EFFECT OF CHEMICALS ON)

TEREKHOVA, N.A.

Conditions for the recovery of Abutilon in infectious chlorosis.

Report No.1: Effect of light. Vop.virus. 4 no.6:724-727 N-D '59.

(MIRA 13:3)

1. Institut mikrobiologii AM SSSR, Moskva.

(VIRUS DISEASES)

(PLANTS dis.)

TEREKHOVA, N.A.

Conditions for the recovery of Abutilon from infectious chlorosis.
Report No.2: Recovery under the effect of defoliation. Vop.virus.
6 no.5:614-618 S-O '60. (MIRA 14:7)

1. Institut mikrobiologii AN SSSR, Moskva.
(ABUTILON—DISEASES AND PESTS)
(CHLOROSIS (PLANTS))

TEREKHOVA, N.A.

Relation between normal and tumorous growth in *Lycopersicum*
esculentum, Zhur.ob.biol. 21 no.1:54-58 Ja-F '60. (MIRA 13:5)

1. Institute of Microbiology, Academy of Sciences of the U.S.S.R.
(TOMATOES) (TUMORS, PLANT)

RYZHKOV, V.L.; TEREKHOVA, N.A.; LOYDINA, G.I.

Causes of the resistance of the Ambalera tobacco variety to the
mosaic virus. Dokl. AN SSSR 134 no.6:1453-1456 O '60.
(MIRA 13:10)

1. Chlen-korrespondent AN SSSR (for Ryzhkov).
(TOBACCO--DISEASE AND PEST RESISTANCE) (MOSAIC DISEASE)

TEREKHOVA, N.A.

Regeneration of normal shoots from bacterial tumors. Zhur.ob.
biol. 23 no.4:289-295 J1-Ag '62. (MIRA 15:9)

1. Institute of Microbiology, U.S.S.R. Academy of Sciences.
(ACROBACTERIUM TUMEFACIENS) (REGENERATION (FOTANY))

RYZHKOV, V.L.; TEREKHOVA, N.A.

Reproduction of tobacco mosaic virus in tumors of *Nicotiana tabacum* and *Nicotiana glutinosa* following intraspecific grafting. Vop. virus. 10 no. 6:678-680 N-D '65 (MIRA 19:1)

1. Institut mikrobiologii AN SSSR, Moskva. Submitted August 7, 1965.

L 3660-66 EMP(e)/EPA(s)-2/EWT(m)/EWP(i)/EPA(w)-2/EMP(b) WW/WH
 UR/0363/65/001/006/0984/0990 27
 6661:542.65 24
 B
 ACCESSION NR: AP5018936
 AUTHOR: Troitskiy, O.A.; Terekhova, N.B.
 TITLE: Mechanical strength of a pyroceramic in relation to the conditions of its preparation, state of the surface, and moisture content
 SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 6, 1965, 984-990
 TOPIC TAGS: pyroceramic, lithium aluminosilicate glass, pyroceramic preparation, glass mechanical property
 ABSTRACT: The article deals with the relationship between the conditions of formation of pyroceramics of the lithium aluminosilicate system during the generation of crystallization centers, their structure, and their properties in samples with various surface states. The samples were subjected to preliminary heat treatments lasting various periods of time at 650C to allow the centers to form, and to the main heat treatment at 780C to cause the crystals to grow. The mechanical strength and microhardness were then measured. Electron microscopy was used to determine the degree of crystallization, and infrared spectra were taken at 2-5 μ to determine the moisture content qualitatively. Some of the

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L 3660-66

ACCESSION NR: AP5018936

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samples were etched with 20% hydrofluoric acid (a 100-200 μ layer was thus removed). It was found that such chemical etching strengthens pyroceramics of the lithium aluminosilicate system catalyzed with titanium dioxide by a factor greater than 2. The microhardness of the pyroceramics was higher than that of the original glass, but the data showed a considerable scatter. The density of the pyroceramic increased with the duration of the pretreatment. The moisture content of the pyroceramics was found to be greater than that of the original glass; the cause of this effect was not determined. Orig. art. has: 4 figures.

ASSOCIATION: Institut fiziki tverdogo tela AN SSSR (Institute of Solid State Physics, AN SSSR)

SUBMITTED: 11Feb65

ENCL: 00

SUB CODE: MT

NC REF SOV: 002

OTHER: 003

beh

Card 2/2

ACC NR: AP7006213

SOURCE CODE: UR/0363/67/003/001/0200/0202

AUTHOR: Troitskiy, O. A.; Terekhova, N. B.

ORG: Institute of Solid State Physics, Academy of Sciences, SSSR (Institut fiziki tverdogo tela Akademii nauk SSSR)

TITLE: Effect of α irradiation on the microplasticity of quartz glass

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 3, no. 1, 1967, 200-202

TOPIC TAGS: alpha radiation, glass, irradiation effect, plasticity

ABSTRACT: The effect of α irradiation with Pu^{239} (particle energy 5.14 MeV) on the microplasticity of quartz glasses was studied by means of microhardness measurements in which the length of the diagonal in indentations made with a diamond pyramid was determined. Both the indenter and the α particles penetrated the glasses to approximately the same depth (10-12 μ). Gauss distribution curves of the microhardness values for deformation of the glass with and without irradiation showed that the field of external α radiation causes a decrease in microhardness or increase in the microplasticity of quartz glass. The number of atoms displaced under the influence of the α bombardment was calculated to be approximately 2.76×10^9 atoms/cm³ sec. From the thermodynamic standpoint, the irradiation affects the strength of the glass by changing the free surface energy of the glass. Orig. art. has: 1 figure and 1 table.

SUB CODE: 20/ SUBM DATE: 02Aug65/ ORIG REF: 006/ OTH REF: 004

Card 1/1

UDC: 666.192+539.104.539.12.04

TEREKHOVA, V. F.

USSR/Metals - Manganese Temperature, Influence

Sep 49

"The Influence of Temperature Upon the Mechanical Properties of Manganese,"
Ye. M. Savitskiy, V. F. Terekhova, Inst of Gen and Inorg Chem imeni N. S.
Kurnakov, Acad Sci USSR, 3 pp

"Dok Ak Nauk SSSR" Vol LXVIII, No 1

Determined effect of temperatures from -195 to 1,240° upon mechanical properties of electrolytic manganese specimens. Hardness was determined directly while specimens were being heated in an electric furnace. Used dry ice and liquid nitrogen to cool specimens. Found that, in manganese, modification with simplest and loosest structure, characterized by least number of atoms in elementary lattice, i.e., gamma-modification, becomes stable in heating. Submitted by Acad G. G. Urazov 30 Jun 49.

PA 2/50T95

TEREKHOVA, V. F.

USSR/Chemistry - Metallurgy

11 Dec 52

"Measurement of Internal Pressures in Polymorphic Metals That Arise Upon Heating," Ye. M. Savitskiy and V. F. Terekhova, Inst of Gen and Inorg Chem imeni N. S. Kurnakov, Acad of Sci USSR

DAN SSSR, Vol 87, No 5, pp 787-789

Cylindrical samples 15 mm in diameter and 30 mm high are placed under pressure in a 7-ton press and the internal pressure measured when the sample is heated electrically. The method is sensitive and could be used as a new method for detg the temps for

254T3

polymorphic and other phase transformations in metals. Presented by Acad G. G. Urazov 15 Oct 52.

PA 254T3

254T3

Effect of temperature on mechanical properties of ger-
manium. I. M. Kovalev and V. P. Terekhov. Zh. S.
Kuznetsov Inst. Gen. Inorg. Chem. Moscow. Khim.
Sovetsk. Ekonomika. 1965. Vol. 2. No. 6. P. 154-60. Has line graph, compres-
sive strength in 1000 kg/cm² interval from 200 to 450. Above
dotted line for Ge in the temp. interval from 200 to 450. Above
900° the ordinarily brittle metal becomes capable of plastic
deformation. A 2-3 fold increase of hardness takes place
in Ge near its m.p. The phenomenon can be explained by
the appearance of ability toward plastic deformation.
G. M. Kosolapoff

"APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755320013-4

APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755320013-4"

SOV/124-58-1-1399

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 1, p 173 (USSR)

AUTHORS: Savitskiy, Ye.M., Terekhova, V.F.

TITLE: Influence of the Temperature on the Mechanical Properties of Cobalt
(Vliyaniye temperatury na mekhanicheskiye svoystva kobal'ta)

PERIODICAL: Tr. In-ta metallurgii AN SSSR, 1957, Nr 1, pp 153-157

ABSTRACT: The authors correlate data relative to the various mechanical properties of cobalt and note that the properties vary within the 350-450°C temperature interval. They attribute these changes to a polymorphic transformation of the cobalt.

Reviewer's name not given

Card 1/1

Terekhova V. F.

137-1957-12-25260

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 12, p 330 (USSR)

AUTHORS: Savitskiy, Ye. M., Terekhova, V. F.

TITLE: The Influence of Temperature on the Mechanical Properties of Alkaline-earth Metals (Vliyaniye temperatury na mekhanicheskiye svoystva shchelочно-zemel'nykh metallov)

PERIODICAL: Tr. In-ta metallurgii. AN SSSR, 1957, Nr 1, pp 162-169

ABSTRACT: Tensile strength, hardness, and plasticity of Mg, Ca, Sr, and Ba were investigated. Experiments were carried out in an atmosphere of Ar, at temperatures between 20° and 800°. According to the decreasing degree of strength and hardness, at 20°, the metals are arranged as follows: Mg, Ca, Sr, Ba. At 550° the differences in strength and hardness are leveled out. The fact that mechanical properties change as a function of temperature, confirms the existence of two polymorphous transformations of Ca and Sr. It is noted that a sharp reduction in plasticity takes place when Ca and Sr change to the hexagonal β modification. High-temperature, cubic γ modifications of these metals are extremely plastic. An increase in σ_b was observed in Ca, Sr, and Ba, at 100-150°. P. N.

Card 1/1

1. Alkaline earth metals - Mechanical properties - Temperature factors

SOV/137-58-7-15957

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 289 (USSR)

AUTHORS: Savitskiy, Ye.M., Terekhova, V.F.

TITLE: Investigation of the Mechanical Properties and Construction of the Diagram of the Recrystallization of Chromium (Issledovaniye mekhanicheskikh svoystv i postroyeniye diagrammy rekristallizatsii khroma)

PERIODICAL: V sb. Issled. po zharoprochn. splavam. Vol 2. Moscow, AN SSSR, 1957, pp 148-157

ABSTRACT: The effect of temperature on the hardness, plasticity, and strength during stretching and compression and also the σ_k of Cr of various grades of purity, namely: hydride (98.5%), aluminothermic (98.9%) and electrolytic (99.5%) was investigated. Aluminothermic Cr has the greatest hardness at room temperature. Its σ_b is 4.7 kg/mm², while that of the electrolytic Cr is 17 kg/mm². The critical point of the brittleness of Cr depends upon its purity. Upon compression the aluminothermic Cr is transformed from the brittle state into the malleable at 300°C; the electrolytic Cr is similarly transformed at 200-250°. Upon a rise of temperature Cr

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SOV/137-58-7-15957

Investigation of the Mechanical Properties and Construction (cont.)

softens considerably. During the transition into the plastic state a certain increase in hardness is observed in Cr of all types at 350-450°. At 1000° electrolytic Cr subjected to monoaxial compression can withstand a single-stroke 90% upsetting without failure. In the 500 to 700° range impact specimens without a notch do not break but bend plastically. In this temperature range Cr can be worked by pressure. A specific characteristic of Cr is its increase in strength with a rise in temperature. This is especially true for impure Cr. The σ_b of aluminothermic Cr increases from 4.7 at 20° to 10 at 1100°, that of electrolytic Cr from 17 at 20° to 28 kg/mm² at 500°. X-ray investigations showed that the increase in the strength of Cr in the 300-500° range is not related to the appearance of a new crystalline modification of Cr. A diagram of the recrystallization of Cr, constructed with the help of microstructural and X-ray methods and by measurement of microhardness, is adduced. Full recrystallization of Cr occurs at 1020°. The hardness and the ductility of Cr after recrystallization do not decrease; the temperature of the transition of Cr from the brittle into the ductile state upon compression is decreased by 30-50%.

1. Chromium--Physical properties 2. Chromium--Crystallization 3. Chromium--Temperature factors
N. K.

Card 2/2

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5(2) PAGE 1 BOOK EXPLANATIONS NOV/1977

Abstracts book USSR. Institut geokhimi i analiticheskoy khimii
 Radioamplitudnyye elementy polucheniya, analize, primeneniye (Rare Earth
 Elements: Extraction, Analysis and Application) Moscow, Izdatvo AS SSSR,
 1976. 331 p. 2,500 copies printed.

Red. Ed.: B. I. Ryabchikov, Professor, Editorial Board: I. P. Alimarin,
 Corresponding Member, USSR Academy of Sciences, I. B. Zaslavskiy, Doctor
 of Chemical Sciences, R. V. Koglyarov, Candidate of Technical Sciences,
 V. I. Kuznetsov, Doctor of Chemical Sciences, M. M. Sanyagin, Candidate of
 Chemical Sciences, and Th. S. Kalyayenko, Candidate of Chemical Sciences;
 Eds. of Publishing House: B. S. Trifonov and T. O. Lova; Tech. Ed.: B. O.
 Markovskiy.

PREFACE: This book is intended for scientists, chemists, teachers and students
 of higher educational institutions, chemical and industrial engineers and
 other persons concerned with the extraction, preparation, use, or study of
 rare earth elements.

CONTENTS: This collection contains reports presented at the June 1976 Conference
 on Rare Earth Elements at the Institute of Geochemistry and Analytical Chem-
 istry (Inst. V. I. Vernadskiy of the Academy of Sciences USSR). The articles
 treat chemical methods of separating rare earth mixtures, methods of processing
 rare earth ores, ion exchange chromatography, chemical analysis, and some in-
 dustrial applications of rare earths. Aside from contributing authors, the
 editors mention the following Soviet scientists who are studying rare earth
 elements, rare earth deposits, extraction methods, and the preparation of acids
 and salts: M. G. Kargin, M. I. Kuznetsov, K. I. Kuznetsov, P. A. Kuznetsov,
 Shantar, M. G. Kargin, M. I. Kuznetsov, K. I. Kuznetsov, P. A. Kuznetsov, Shantar,
 majority of rare earth elements in the USSR, and the rare earth elements in
 industrial equipment. The authors included determined their specific properties.
 References are given at the end of each article.

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Redchikov, V. M., and V. A. Kuznetsov (Vsesoyuznyy nauchno-issledovatel'skiy institut khimii, Odeskitskiy filial) Rare "Vernadskiy" No. 25 (All-Union Scientific Research Institute for Glass, Chemicals Branch; Plant "Vernadskiy" No. 25). Some Problems of Using Rare Earth Elements in the Glass Industry	295
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Card 10/11

Terekhova V. F.

AUTHORS: Savitskiy, Ye. M., Doctor of Chemical Sciences 30-2-42/49
Terekhova, V. F., Candidate of Technical Sciences

TITLE: Investigation of the Alloys of Rare Metals (Issledovaniye splavov
redkikh metallov)
All-Union Conference (Vsesoyuznoye soveshchaniye)

PERIODICAL Vestnik Akademii Nauk SSSR, 1958, Nr 2, pp 111-112
(USSR)

ABSTRACT: On November 18 - 20, 1957, an All Union Conference was called by
the Institute for Metallurgy imeni A. A. Baykov of the AN USSR
and the Board for Rare Metals at the Scientific Technical
Committee of the Cabinet Council of the USSR. The conference was
attended by representatives of scientific research institutes,
universities and industry. Reports on raw material sources of
rare metals and their production in pure state, problems of
scientific investigations of alloys of rare metals, investigation
results of alloys of various systems, their physical chemical
properties and industrial application were delivered and discuss-
ed. Serious shortcomings hindering the development of research
were pointed out. Above all, the intensification of the product-
ion of pure rare metals was demanded. The determination of the

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Investigation of the Alloys of Rare Metals.
All Union Conference

30-2-42/49

constants of physical chemical properties of pure rare metals and their alloys has to be regarded as the least investigated which hinders its rational introduction into political economy. Also systematical work in this field is carried out insufficiently. There is also a lack of information in this field; no special periodical exists. The importance of the ascertainment of new metals with addition of rare metals for the new technica was stressed. Research work must be considerably extended and carried out more quickly. For this work also the institutions of the AN JSSR and their subsidiaries, the academies of the Republics of the Union, branch institutes, universities, and laboratories must join. The Institute for Metallurgy was charged with the coordination of the work. The resolution was also made to carry out the work methodically so as to shorten the necessary time and to reduce the expenses of research work. Equally the demand for an own periodical was expressed.

AVAILABLE: Library of Congress

Card 2/2

1. Rare metals-Sources
2. Rare metals-Alloys
3. Scientific research-Rare metals
4. Metallurgy-USSR
5. Rare metals-Production

SAVITSKIY, Ye.M.; TEREKHOVA, V.F.

Mechanical properties and recrystallization diagram of zirconium iodide.
Trudy Inst.met. no.3:181-190 '58. (MIRA 12:3)
(Zirconium iodide--Testing)

78-3 3-37/47

AUTHORS: Savitskiy, Ye. M. , Terekhova, V. F.

TITLE: The Phase Diagrams of the Alloys of Lanthanum With Cerium and Lanthanum With Calcium (Diagrammy sostoyaniya splavov lantana s teeriyem i lantana s kal'tsiyem)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 1, pp. 756-762 (USSR)

ABSTRACT: The phase diagrams of the alloys of lanthanum with cerium, and lanthanum with calcium were investigated by thermal analysis, and by the determination of microstructure, hardness and electric resistance, and the diagrams were constructed. In the system lanthanum-cerium purest metallic cerium with 97 - 99 % purity and lanthanum with 98,5 % purity were used. Lanthanum and cerium dissolve in a liquid and solid state and form a diagram with unlimited solubility. In the system lanthanum-calcium the initial metals were molten in a vacuum under an argon atmosphere. The produced alloys were investigated by the determination of microstructure and the analyses showed that in a solid state a layer formation is to be

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78-3 3-37/47

The Phase Diagrams of the Alloys of Lanthanum With Cerium and Lanthanum With Calcium

noticed. The thorough investigation by the microstructure determination showed that in a solid state more than two layers occur. The occurrence of two layers in the alloys can already be observed at a calcium content of more than 12 - 15 %. With an increase in the calcium content to 30-60 % the thickness of the outer layer highly increases. By the chemical analyses, the determination of the specific weight and the hardness of the layers it was found that the upper layer consists of calcium and the lower one of lanthanum. The alloys with about 1 % calcium consist of a phase of solid solution. The alloys with 60 - 80 % calcium have three layers of which the middle one is of polyhedral structure and is rich in calcium. The solubility of lanthanum in calcium and of calcium in lanthanum at an eutectic temperature of 705°C is not higher than 3 - 5 %. There are 15 figures, 4 tables, and 8 references, 3 of which are Soviet.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Metallurgical Institute imeni A. A. Baykov, AS USSR)

SUBMITTED: June 10, 1957

Card 2/2

SOV/78-3-9-22/38

AUTHORS: Savitskiy, Ye. M., Terekhova, V. F., Novikova, I. A.

TITLE: The Phase Diagram of the Alloys of the System Magnesium-Neodymium (Diagramma sostoyaniya splavov sistemy magniy-neodim)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 9, pp 2138-2142 (USSR)

ABSTRACT: The thermal analysis, the microstructure, and the determination of the microhardness were used for the construction of the phase diagram of the system magnesium-neodymium. The hardening method was used for the determination of the solubility of neodymium in magnesium in solid state. Chemical compounds of neodymium and magnesium exist in the solid solutions of neodymium in magnesium within the range of 40 - 60 percents by weight neodymium. Considerable structural changes of the alloys occur with an increase of the neodymium content up to 1%. If neodymium is added to magnesium, the hardness is increased and the mechanical properties of the alloys are improved. The strength and plasticity of the alloys in the system neodymium-magnesium in the region of the solid solution on the basis of magnesium are increased with rising neodymium content. At 150

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SOV/78-3-9-22/38

The Phase Diagram of the Alloys of the System Magnesium-Neodymium

and 250°C the alloys of magnesium with neodymium are considerably more solid than pure magnesium. The microstructure of the alloys changes to a great extent in alloys with 10% neodymium, they reach the maximum dispersion at 25% neodymium. There are 4 figures, 2 tables, and 7 references, 4 of which are Soviet.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Institute of Metallurgy imeni A. A. Baykov, AS USSR)

SUBMITTED: January 21, 1958

Card 2/2

S/137/60/000/009/018/029
A006/A001

Translation from: Referativnyy zhurnal, Metallurgiya, 1960, No. 9, pp. 257-259,
21596

AUTHORS: Savitskiy, Ye.M., Terekhova, V.F., Tsikalov, V.A.

TITLE: Investigation of the Physico-Chemical Interactions of Rare-Earth
Metals With Iron and Steel

PERIODICAL: V sb.: Redkozemel'n. elementy v stalyakh i splavakh, Moscow,
Metallurgizdat, 1959, pp. 31-49

TEXT: The authors studied the interaction of rare-earth metals, such as
La and Ce, with S, O, Si and C of steel and the effect of Ce and La on the mechan-
ical properties of Fe. The Fe-La system, with up to 2 weight percent La, was
studied by microscopical, electronscopical and mechanical methods. It is estab-
lished that small additions of rare-earth metals (0.2-0.5%) refine considerably
the structure of Fe and steel. Rare-earth metals are strong deoxidizers which
cause the fine-dispersed distribution of oxide impurities. The addition of 0.2-
0.5% rare-earth metals to steel containing S > 0.1% cause considerable desulfuri-
zation.

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S/137/60/000/009/018/029

A006/A001

Investigation of the Physico-Chemical Interactions of Rare-Earth Metals With Iron and Steel

zation. At a S content of $< 0.02-0.03\%$, desulfurization is not observed. The presence of $< 0.2\%$ Si in the steel does not reduce the refining effect of Ce. The rare-earth metals introduced into the steel in an amount of $0.9-1.5\%$, interact with C, forming carbides, and reduce considerably the perlite content in the steel. The addition of $0.1-0.2\%$ rare-earth metals causes higher strength, ductility and α_k of steel. An increase of the rare-earth metal content from 0 to $> 3\%$ reduces the mechanical properties of Fe and steel due to the formation of brittle intermetallic compounds of Fe with the rare-earth metals. At a La content of $> 0.4-0.5$ weight %, a second phase is observed in the Fe-La system. Solubility of La in γ -Fe is greater than in α -Fe. A considerable improvement of physico-mechanical properties of Fe-Al alloys was observed when rare-earth metals were introduced in an amount of up to 5 weight %.

A.R.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

SOV/136-59-1-12/24

AUTHORS: Savitskiy, Ye.M., and Terekhova, V.F.

TITLE: Yttrium and its Alloys (Yttriyye i yego splavy)

PERIODICAL: Tsvetnyye Metally, 1959, Nr 1, pp 48-53 (USSR)

ABSTRACT: The authors have carried out an investigation of the microstructure and properties of yttrium and its alloys and the reaction and influence of the element on alloy properties. Yttrium for the investigation was supplied by D.D. Sokolov, L.A. Izhvanov and N.P. Vershinin. The purity of the metal was 96.5%, its microstructure characterised by inclusions of a second phase both at grain boundaries and within grains (Fig 1). The Brinell hardness was 80-85 kg/mm² and the ultimate strengths in tension and compression were 16 and 82 kg/mm². It was found that yttrium is completely dissolved by cerium; with aluminium, iron and copper eutectic mixtures are found; in alloys with chromium, titanium and zirconium, yttrium does not dissolve in large quantities, with peritectoid reactions over small concentration ranges and immiscibility in the solid state at higher yttrium contents; yttrium is practically immiscible with vanadium, niobium, tantalum and molybdenum. The

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Yttrium and its Alloys

SOV/136-59-1-12/24

introduction of 0.1 - 0.2% yttrium refines the grains of almost all the cast metals studied, but with aluminium and magnesium the opposite effect is produced. Yttrium has a deoxidizing and inoculating effect on all the alloys and with magnesium and aluminium the element has a hardening effect. The authors recommend that the study of the alloying action of yttrium should be made the subject of special investigations.

Figs 3,4,6 and 7 show microstructures of alloys of yttrium with aluminium, chromium, copper and zirconium, respectively, Fig 2 shows the macro- (left) and microstructures (centre and right) for a 10-% Y magnesium alloy and Fig. 5 the microstructures of 10-% Y alloys with molybdenum (left), tantalum (centre) and vanadium

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Yttrium and its Alloys

SOV/136-59-1-12/24

(right).

There are 7 figures and 8 references, 6 of which are Soviet and 2 English.

ASSOCIATION: Institut Metallurgii AN SSSR (Institute of Metallurgy, AS USSR)

Card 3/3

SOV/129-59-3-9/16

AUTHORS: Savitskiy, Ye.M., Terekhova, V.F. and Burov, I.V.

TITLE: Influence of Rare Metals on the Mechanical Properties of Iron-aluminium Alloys (Vliyaniye redkikh metallov na mekhanicheskiye svoystva zhelezoaluminiumyevykh splavov)

PERIODICAL: Metallovedeniye i Termicheskaya Obrabotka Metallov, 1959, Nr 3, pp 38 - 43 + 2 plates (USSR)

ABSTRACT: Up to relatively recently, it was not possible to produce Fe-Al alloys with aluminium content of about 16 wt.% with an elongation at room temperature exceeding 3%. The cause of such brittleness was obviously the large quantity of non-metallic Al_2O_3 inclusions, the presence of a considerable quantity of admixtures in the original iron and also the formation of chemical compounds and of superstructures. The increased brittleness is also brought about by the tendency of these alloys to form a large number of micro-cracks due to low-temperature conductivity and also due to the tendency to grain growth. The authors investigated the effects of applying rare metals for improving the

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SOV/129-59-3-9/16

Influence of Rare Metals on the Mechanical Properties of
Iron-aluminium Alloys

mechanical properties of alloys of this type. The alloys were produced using as starting materials electrolytic iron of 99.58% purity and aluminium of 99.99% purity. The influence was investigated of alloying additions of the following elements: Zr, Ti, Ta, Nb, V, B, Mo, Ce. The additions were selected for the purpose of determining their influence as deoxidation agents, inoculation substances and carbide-forming substances. The chemical composition of the investigated 38 alloys is entered in Table 1, p 40. The effect of the individual elements on the mechanical properties was investigated and also on the magnetic and the technological properties. In Figure 6, the dependence of the hardness on additions of rare metals is graphed for iron-aluminium alloys containing 15-16% Al. In Figure 7, the influence of cerium on the macro- and microhardness of iron-aluminium alloys is graphed. In Figure 8, the influence of additions of rare metals on the strength of iron-aluminium alloys is graphed. Figures 2-5 show microphotos

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SOV/129-59-3-9/16

Influence of Rare Metals on the Mechanical Properties of
Iron-aluminium alloys

(magnification 100 times) of Fe-Al alloys containing various additions and also non-metallic inclusions. In Figure 9, the influence of zirconium and tantalum on the ductility of Fe-Al alloys during hot rolling is graphed. Numerical data on the influence of zirconium and tantalum on the impact strength of alloys are entered in Table 2; numerical data on the influence of Ta, Zr and Ce on the tensile strength of Fe-Al alloys are entered in Table 3. The authors arrived at the following conclusions. 1) The main harmful admixture which causes brittleness of Fe-Al alloys is oxygen, which forms occlusions of aluminium oxides along the boundaries and in the body of the grains. A good method of producing alloys with a minimum content of oxygen is induction smelting, in a pure helium atmosphere, in crucibles made of aluminium oxide and introducing aluminium on the surface of the metal. It is necessary to deoxidise primarily the iron in vacuum with carbon or hydrogen..

Card3/5 2) An appreciable refining of the grain of Fe-Al alloys

SOV/129-59-3-9/16

Influence of Rare Metals on the Mechanical Properties of
Iron-aluminium Alloys

occurs as a result of additions of Ti and combined additions of cerium with zirconium, cerium with molybdenum and cerium with vanadium.

3) Boron and vanadium in quantities up to 0.05 - 0.2% increases appreciably the hardness of the alloys. The strength of the alloys increases from

22 - 37 kg/mm² as a result of addition of 0.05% boron; tantalum (0.2%) and zirconium (0.5%) increases the

strength by 20 - 25 kg/mm² and also the impact strength and the ductility during hot rolling.

4) Magnetic Fe-Al alloys can be easily deformed in the hot state and rolled into sheet. Non-magnetic alloys (based on FeAl compounds) can be rolled only if the optimum rolling regimes are equally complied with (a well-treated surface, small values of reduction, low speeds of deformation and strict adherence to the specified temperature conditions).

5) Combined alloying with cerium (0.25%), vanadium (0.25%)

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SOV/129-59-3-9/16

Influence of Rare Metals on the Mechanical Properties of
Iron-aluminium Alloys

and molybdenum (1.8%) brings about a shift in the line of the magnetic transformation of the iron-aluminium alloys (from 16 to 14% Al content).

6) None of the investigated alloys oxidises in air at 1 200 °C and all have a corrosion resistance commensurate with that of refractory steels. The specific gravity of such Fe-Al alloys (containing 16% Al) is 20% lower than the specific gravity of steel.

7) Iron-aluminium alloys alloyed with small quantities of cerium, zirconium, tantalum, etc. can be applied as relatively cheap high-strength materials at room and at elevated temperatures and also as materials with a high resistance to corrosion. There are 9 figures, 3 tables and 15 references, 5 of which are Soviet, 1 Japanese, 1 German and 8 English.

ASSOCIATION: Institut metallurgii AN SSSR (Institute of
Metallurgy of the Ac.Sc.USSR)

Card 5/5

18(6)

AUTHORS:

SOV/78-4-2-28/40
Savitskiy, Ye. M., Terekhova, V. P., Kholopov, A. V.

TITLE:

The Phase Diagram of the Alloys of the System Chromium-Cerium
(Diagramma sostoyaniya splavov sistemy khrom-tseriy)

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 2,
pp 435-438 (USSR)

ABSTRACT:

The phase diagram of the alloys chromium-cerium (up to 30 weight % cerium) was investigated by micro-structure analyses, thermal analyses, and X-ray analyses. Electrolytic chromium (99.5%) and metallic cerium (99%) were used as initial materials. In the system chromium-cerium separation into two layers takes place in a wide range (10 to 90% cerium) upon liquid state at 1780°. The analyses of the micro-structure of the alloys show that in the field of the solid solution the solidity of the alloy rises upon increase of cerium content. Cerium additions amounting from 1-1.5% to chromium increase the solidity of chromium and refine its structure. Alloys of the system chromium-cerium with cerium contents > 3% are unstable in air and decompose while cerium oxides are formed. The liquidus and solidus curves of these alloys

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SOV/78-4-2-28/40

The Phase Diagram of the Alloys of the System Chromium-Cerium

were determined. D. Ya. Svet and V. V. Grishin participated in these determinations. The solubility of cerium in solid chromium was determined and it was found that the solubility is 2-3% at 1500°, 3-5% at 1600°, and 5-10% at 1700°. The solubility curve of cerium in solid chromium, depending on the temperature, was drawn on the basis of the micro-structure analysis. The phase diagram of the alloys chromium-cerium (up to 30% cerium) was drawn according to data on micro-structure and thermal analyses. There are 8 figures, 2 tables, and 7 references, 4 of which are Soviet.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences, USSR)

SUBMITTED: November 29, 1957

Card 2/2

18(6)

SOV/78-4-6-43/44

AUTHORS: Savitskiy, Ye. M., Terekhova, V. F., Tsikalov, V. A.

TITLE: The Phase Diagram of the Alloys Aluminum-Yttrium (Diagramma sostoyaniya splavov alyuminiya s ittriyem)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 6, pp 1461 - 1462 (USSR)

ABSTRACT: The system aluminum-yttrium was investigated for the first time. Alloys up to 60 percentages by weight yttrium were produced and investigated by metallographic, thermal, and X-ray structural analyses and the microhardness was determined. Aluminum of the type AV-000 and metallic yttrium of a purity of 99.6% were used as initial materials. The phase diagram of the alloys aluminum-yttrium (60 percentages by weight yttrium) is a complicated system with occurrence of chemical compounds (Fig 1). Chemical compounds occur as crystals in alloys with 13.5 and 42 percentages by weight yttrium. The microstructure of the alloys aluminum-yttrium with 0.34, 8.78, 42.1 and 57.3 percentages by weight yttrium is given in figure 2. Alloys with 57.3 percentages by weight yttrium

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The Phase Diagram of the Alloys Aluminum-Yttrium

SOV/78-4-6-43/44

have a composition which corresponds to the formula $Al_{15}Y_2$.
The microhardness of this alloy amounts to 600 kg/mm^2 . By
the X-ray structural analysis it was found that this compound
has a complicated crystal structure. Further investigations
are necessary for the completion of the phase diagram aluminum-
yttrium. There are 2 figures.

SUBMITTED: January 30, 1959

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SOV/78-4-6-44/44

18(6)
AUTHORS: Savitskiy, Ye. M., Terekhova, V. F., Burov, I. V.

TITLE: Investigations of the Alloys of Niobium With Lanthanum and Cerium (Issledovaniye splavov niobiya s lantanom i tseriyem)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 6, pp 1462 - 1463 (USSR)

ABSTRACT: Thermal-, microstructure-, and X-ray analyses were carried out in the alloys of niobium with lanthanum and the hardness and the electric resistance were determined. On the strength of the investigations phase diagrams of the systems niobium-cerium and niobium-lanthanum (up to 50 percentages by weight cerium and lanthanum) were constructed and given in figures 1 and 2. Niobium of a purity of 99%, metallic lanthanum of 99%, and cerium of a purity of 98.9% were used as initial materials. It was found that niobium with lanthanum and cerium has in the liquid and solid phase wider immiscible regions. The formation of layers in the system niobium-cerium begins already in the case of 1 - 2% cerium and in the alloys niobium-lanthanum in the case of 0.1 - 0.2% lanthanum. The solubility of cerium

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Investigations of the Alloys of Niobium With Lanthanum and Cerium SOV/78-4-6-44/44

and lanthanum in niobium in solid state is not higher than 0.05%. It was found that the plasticity of niobium is increased by the addition of 0.3 - 0.5% cerium. There are 2 figures.

SUBMITTED: January 30, 1959

Card 2/2

SAVITSKIY, Ye.M.; TEREKHOVA, Y.F.

Yttrium and its alloys. Tsvet. met. 32 no.1:48-53 Ja '59.

(MIRA 12:1)

1. Institut metallurgii AN SSSR.

(Yttrium--Metallography) (Yttrium alloys)

PLATE 1: ROCK DISPOSITION

SOVI/2162

Восстановление работоспособности по поврежденной матрице металла. Изв. Академии наук СССР, 1957

Будильников В. И., Голышев В. И. и др. Металлы и сплавы: "Транзакции" 1-й Всесоюзной конференции по сверхпластичности. М.: Металлургиздат, 1962. С. 3-50. Рис. 10. Табл. 1.

Spendering demokrasii: Abolitsiya munit. SSSR. Izvestia sovetskogo gosudarstva po razvitiu metallurg. i mashinostroitelstva kumkoto.

[illegible]

PURPOSE: This collection of articles is intended for millwrights, engineers, physicists, and workers in the machine-building and fitting-out industries. It may also be used by students of schools of higher education.

CONTRACT: The collection contains technical papers which were presented and discussed at the First All-Union Conference on Physical Alloys, held in the Institute of Metallurgy, Academy of Sciences USSR in November 1979. Reports of discussion of new-type alloys, titanium and copper-base alloys with additions of rare earths are presented and illustrated with illustrations of their physical, mechanical, and chemical properties. The effect of rare-earth additions on properties of magnesium alloys and steels is analyzed. The uses of titanium alloying alloy for metallurgical materials, and some of its alloys for the fabrication of electrical systems are discussed. Also, the effect of treatment of titanium alloys on the properties of heat-resistant magnesium alloys is discussed. The special physical properties of intermetallic compounds (intermetallic alloys) are discussed. No presentational papers are included. Printed and microfilm editions are available. 10 pages. 1980. \$1.00. 1980. \$1.00.

PAGE 11. SECURITY AND CONTROL
ALLOTS WITH BAZ-1274. EDITING

-Here Metals (Cont.)

SDT/4162

Attorneys: J. L. A. L. Gibbons, Jr., Esq., Chicago, Ill., Solemnly and M. J. Kallier. Current residence at Chicago and its vicinity

PAGE 11. LAST LINE PERIOD
AND THEIR EFFECT ON PROPERTIES OF MAGNETIC ALLOYS

Publication No. 10-5. SLIPSTREAM: Bare-Earth Elements and Possibilities

1060
Tofield, Z., V. H. Bennett, and L. W. Burgin. Production of Acetate-Carboxyl, Malate-Carboxyl, Magnesium-Carboxyl, Magnesium-Carboxyl, and Magnesium-Carboxyl Alloys by Electrosynthesis

Williams, Y. J., and M. L. Fort. Extraction of Bar- Earth Metals and Possibi- lities of Their Practical Utiliza- tion.	169
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AUTHORS: Savitskiy, Ye.M., Stepanov, Ye.S. and Terekhova, V.F. (Moscow)

TITLE: Neodymium and Its Alloys with Aluminium

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, Nr 3, pp 73 - 78 (USSR).

ABSTRACT: The object of the present investigation was to determine the physical and mechanical properties of pure (99.5%) neodymium and neodymium-aluminium alloys. The following properties were determined for cast neodymium: Brinell hardness 46 kg/mm^2 ; ultimate compressive strength - 25 kg/mm^2 ; ductility (in compression) - 36%. It has been found that neodymium is characterised by good, both hot and cold, workability, it being possible to produce neodymium strip, 0.5 mm thick, by cold-rolling with intermediate annealings at $500 - 600^\circ \text{C}$. Neodymium, cold-rolled to 70% reduction in thickness, had the UTS equal to 13 kg/mm^2 and ductility (in tension) equal 1-2%. The constitution diagram of the aluminium-neodymium system, constructed on the basis of metallographic and thermal analysis, is shown in Figure 3. It has been found that

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Neodymium and Its Alloys with Aluminium

solid solubility of neodymium in aluminium does not exceed 0.2%. A eutectic, containing approximately 13 wt.% neodymium, is formed at about 640 °C. In the investigated concentration range, the existence of two intermetallic compounds, $NdAl_4$ and $NdAl_2$, has been

observed. The former is formed as a result of a peritectic reaction at 1 250 °C; the latter crystallizes out from the liquid phase at 1 450 °C. Owing to the formation of the intermetallic compounds, addition of neodymium to aluminium increases the strength of the latter metal. Hardness of an aluminium-base alloy containing 30 wt.% neodymium is 155 kg/mm², as compared with 25 kg/mm² for pure aluminium; addition of 5% neodymium increases the

UTS of aluminium from 5 to 10 kg/mm² and lowers its ductility by 5-10%. Hardness of the intermetallic compounds $NdAl_4$ and $NdAl_2$ is 350 and 600 kg/mm², respectively.

The electrical restivity of aluminium is not significantly affected by addition of neodymium; resistivity of the

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Neodymium and Its Alloys with Aluminium

5% Nd-Al alloy is practically equal to that of pure aluminium. The effect of temperature up to 300 °C on the mechanical properties of the Al-Nd alloys with up to 5% Nd has been also investigated. Figure 1 shows the microstructure of neodymium (a) cast, (b) after 70% cold deformation and (c) after cold deformation to 70% and annealing at 500 °C. Figure 2 shows the microstructure of the aluminium-neodymium alloys (cold-worked and annealed), containing 0, 0.74, 1.05, 9.24, 24.21, 47.47 and 66% neodymium. There are 3 figures, 2 tables and 9 references, 7 of which are Soviet and 2 English.

SUBMITTED: March 2, 1960

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5(2)
AUTHORS:

SOV/78-5-1-43/45

Terekhova, V. P., Markova, I. A., Savitskiy, Ye. M.

TITLE:

Alloys of Magnesium With Yttrium

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 1,
pp 235-236 (USSR)

ABSTRACT:

The authors investigated the influence exerted by yttrium upon the properties of magnesium and plotted the phase diagram for the system Mg - Y, on which there are no data available. They studied the macro- and microstructure of 19 alloys with an yttrium content of up to 55%, carried out the thermal analysis, and measured their hardness. Figure 1 shows the microstructure of magnesium alloys with different yttrium content. Figure 2 illustrates the phase diagram recorded by a Kurnakov pyrometer, and represents the dependence of microhardness on the content of the second component. In alloys with more than 40% of yttrium, a compound of Mg with Y (probably Mg_3Y) was formed, whose crystallographic data were determined by P. I. Kripyakevich and Ye. I. Gladyshevskiy. The phase diagram shows that it is similar to the earlier investigated diagrams of the

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systems Mg - La, Mg - Ce, Mg - Pr, and Mg - Nd, but the melting point of its eutectic is higher. Thus, this Mg - Y system obtains better physical and mechanical properties than the systems formed by Mg and other rare earth elements. There are 2 figures and 3 Soviet references.

SUBMITTED: July 23, 1959

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